

Altivar 61 Plus

90 ... 2400 kW

Configuration guide

English

04/2010



General remarks

The following symbols should assist you in handling the instructions:



Advice, tip !



General information, note exactly !

The requirements for successful commissioning are correct selection of the device, proper planning and installation. If you have any further questions, please contact the supplier of the device.

Capacitor discharge !

Before performing any work on or in the device, disconnect it from the mains and wait at least 15 minutes until the capacitors have been fully discharged to ensure that there is no voltage on the device.

Automatic restart !

With certain parameter settings it may happen that the frequency inverter restarts automatically when the mains supply returns after a power failure. Make sure that in this case neither persons nor equipment is in danger.

Commissioning and service !

Work on or in the device must be done only by duly qualified staff and in full compliance with the appropriate instructions and pertinent regulations. In case of a fault contacts which are normally potential-free and/or PCBs may carry dangerous voltages. To avoid any risk to humans, obey the regulations concerning "Work on Live Equipment" explicitly.

Terms of delivery

The latest edition "General Terms of Delivery of the Austrian Electrical and Electronics Industry Association" form the basis of our deliveries and services.

Specifications in this document

We are always anxious to improve our products and adapt them to the latest state of the art. Therefore, we reserve the right to modify the specifications given in this document at any time, particular those referring to weights and dimensions. All planning recommendations and connection examples are non-binding suggestions for which we cannot assume liability, particularly because the regulations to be complied depend on the type and place of installation and on the use of the devices.

All foreign-language translations result from the German or English version. Please consider those in case of unclarity.

Basis of contract

The specifications in text and drawings of this document are no subject of contract in the legal sense without explicit confirmation.

Regulations

The user is responsible to ensure that the device and its components are used in compliance with the applicable regulations. It is not permitted to use these devices in residential environments without special measures to suppress radio frequency interferences.

Trademark rights

Please note that we do not guarantee that the connections, devices and processes described herein are free from patent or trademark rights of third parties.

Copyright

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Altivar 61 Plus

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Type of machine	Pumps and fans (industrial environment)	Complex machines
		
Type	ATV 61	ATV 71
Power range	0.37...800 kW	0.37...630 kW
Voltage ranges	1 AC 200...240 V (0.37...5.5 kW) 3 AC 200...240 V (0.75...90 kW) 3 AC 380...480 V (0.75...630 kW) 3 AC 500...690 V (2.2...800 kW)	1 AC 200...240 V (0.37...5.5 kW) 3 AC 200...240 V (0.37...75 kW) 3 AC 380...480 V (0.75...500 kW) 3 AC 500...690 V (1.5...630 kW)
Output frequency	0.1...500 Hz for the whole power range 0.1...1000 Hz up to 37 kW	0.1...500 Hz for the whole power range 0.1...1000 Hz up to 37 kW
Control method	V/f characteristic (2 or 5 points), vector-oriented flux control without feedback, energy saving system	V/f characteristic (2 or 5 points), vector-oriented flux control with/without encoder, ENA system
Interfaces	Removable operating panel, extensible terminals, programmable card "Drive-Controller", multi-pump card, Profibus DP, CANopen, Ethernet TCP/IP, Fipio, Modbus Plus, INTERBUS, Modbus/Uni- Telway, DeviceNet, LonWorks, METASYS N2, APOGEE FLN, BACnet	Removable operating panel, extensible terminals, programmable card "Drive-Controller", multi-pump card, Profibus DP, CANopen, Ethernet TCP/IP, Fipio, Modbus Plus, INTERBUS, Modbus/Uni- Telway, DeviceNet
Protection degree	Built-in units: IP31 / IP20 Wall-mounting devices: IP31	Built-in units: IP31 / IP20 Wall-mounting devices: IP31
Further reading	All information about project planning and order can be found in the product catalogue "Variable speed drives for asynchronous motors Altivar 61".	All information about project planning and order can be found in the product catalogue "Variable speed drives for asynchronous motors Altivar 71".

Type of machine	Pumps and fans	All drives with high performance in industry, machine building and automation																
																		
Type	ATV 61 Plus		ATV 71 Plus															
Brief description	Altivar Drive Systems with increased protection degree, alternatively in the standard design, with additionally installed options or as a customized solution		Altivar Drive Systems with increased protection degree, alternatively in the standard design, with additionally installed options or as a customized solution															
Power ranges	<table border="1"> <tr> <td>ATV61ES5●●●N4</td> <td>90...630 kW</td> </tr> <tr> <td>ATV61EX●●●●●N4</td> <td>90...1400 kW</td> </tr> <tr> <td>ATV61EX●●●●●N</td> <td>90...1800 kW</td> </tr> <tr> <td>ATV61EX●●●●●Y</td> <td>110...2400 kW</td> </tr> </table>	ATV61ES5●●●N4	90...630 kW	ATV61EX●●●●●N4	90...1400 kW	ATV61EX●●●●●N	90...1800 kW	ATV61EX●●●●●Y	110...2400 kW	<table border="1"> <tr> <td>ATV71ES5●●●N4</td> <td>90...500 kW</td> </tr> <tr> <td>ATV71EX●●●●●N4</td> <td>90...1300 kW</td> </tr> <tr> <td>ATV71EX●●●●●N</td> <td>90...1500 kW</td> </tr> <tr> <td>ATV71EX●●●●●Y</td> <td>110...2000 kW</td> </tr> </table>	ATV71ES5●●●N4	90...500 kW	ATV71EX●●●●●N4	90...1300 kW	ATV71EX●●●●●N	90...1500 kW	ATV71EX●●●●●Y	110...2000 kW
ATV61ES5●●●N4	90...630 kW																	
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ATV71EX●●●●●N	90...1500 kW																	
ATV71EX●●●●●Y	110...2000 kW																	
Voltage ranges	<table border="1"> <tr> <td>ATV61EX●●●●●N4</td> <td>400 (380, 415) V</td> </tr> <tr> <td>ATV61EX●●●●●N</td> <td>500 (525) V</td> </tr> <tr> <td>ATV61EX●●●●●Y</td> <td>690 V</td> </tr> </table> <p>Other voltages are available on request</p>	ATV61EX●●●●●N4	400 (380, 415) V	ATV61EX●●●●●N	500 (525) V	ATV61EX●●●●●Y	690 V	<table border="1"> <tr> <td>ATV71EX●●●●●N4</td> <td>400 (380, 415) V</td> </tr> <tr> <td>ATV71EX●●●●●N</td> <td>500 (525) V</td> </tr> <tr> <td>ATV71EX●●●●●Y</td> <td>690 V</td> </tr> </table> <p>Other voltages are available on request</p>	ATV71EX●●●●●N4	400 (380, 415) V	ATV71EX●●●●●N	500 (525) V	ATV71EX●●●●●Y	690 V				
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ATV71EX●●●●●Y	690 V																	
Output frequency	0.1 ... 500 Hz		0.1 ... 500 Hz															
Control method	V/f characteristic (2 or 5 points), vector-oriented flux control without feedback, energy saving system	V/f characteristic (2 or 5 points), vector-oriented flux control with/without encoder, ENA system																
Interfaces	Operating panel in the enclosure door with a transparent cover, control terminals alternatively directly in the inverter or in the enclosure, control terminals can be extended, fieldbus connection via Modbus or CANopen	Operating panel in the enclosure door with a transparent cover, control terminals alternatively directly in the inverter or in the enclosure, control terminals can be extended, fieldbus connection via Modbus or CANopen																
Protection degree	IP23 design of the enclosure IP54 design of the enclosure IP54 design of the enclosure with separated air flow	IP23 design of the enclosure IP54 design of the enclosure IP54 design of the enclosure with separated air flow																
Further reading	All information about project planning and order can be found in this document.		All information about project planning and order can be found in this document.															

Frequency inverter standard enclosures



The ATV61 Plus "Simplified version" is an optimised concept for enclosures that guarantees delivery dates as short as possible due to the standardised components!

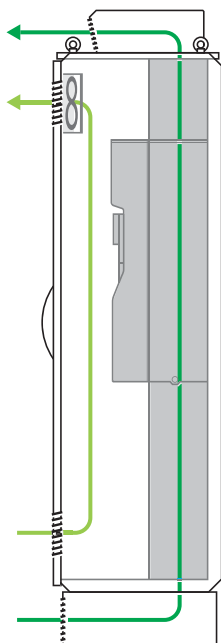
The cooling concept IP54 with separated air flow for power part and control part of the frequency inverter provides manifold applications for this inverter series.

Configuration features of the "Simplified version"

These Altivar enclosure units are an extension to the Altivar frequency inverter offer. The basic equipment contains a frequency inverter ATV61 or ATV71, a circuit breaker and a DC choke to reduce the harmonics.

The design is based on the standard enclosure system Sarel S6000 with an enclosure plinth which is 200 mm high and an operating panel integrated into the enclosure door.

Device features



Enclosure system

The Sarel S6000 enclosure system with additional internal reinforcement elements and slide bars for easy installation and removal of the inverter devices and other power components can be added to any existing enclosure systems.

Cooling concept

In case of protection degree IP54 with separate air channel the cooling air inlet for the power part takes place through the plinth and the air outlet through the enclosure roof. The control part is cooled by filter fans in the cubicle door.

Operation / parameterization

For safe control, clear parameterization and fast diagnosis, the operating panel is installed in the enclosure door at an ideal height. A transparent protective cover and an adjustable locking code prevent the unintended parameter adjustments.

Connection

The power cables are connected at the mains side directly at the circuit breaker. There are terminals or bars provided for the motor output. The cables are to be connected at the bottom.

Enclosure design 400 V "Simplified version"

General technical data

Mains voltage	400 (380, 415) V ±10%, 50/60 Hz ±5 % for TT, TN-C, TN-S or IT networks
Maximum current	120 % for 60 s per 10 minutes, 135 % for 2 seconds
Operating temperature	0 ... +40°C, up to +50°C with derating possible
Standards	CE, EMC filter for 2- "industrial environment" C3 integrated
General design	Enclosure system S6000 in RAL 7032, enclosure plinth in RAL 7022 Controls in the enclosure door with additional protective cover, Cable entry from below, enclosure depth 616 mm (659 mm incl. door handle)
Interfaces	Control terminals directly at the inverter, fieldbus connection via Modbus or CANopen

ATV61ES5●●●N4

IP54SA with separated air flow	Air flow through enclosure plinth and mounted air guidance hood, cooling of the control part by means of filter fans in the enclosure door, enclosure height of 2359 mm (incl. 200 mm plinth)
Standard equipment	Frequency inverter ATV61, circuit breaker, DC brake, motor terminals, terminals for external braking resistor (only ATV61ES5D90N4 ... ATV61ES5C22N4), operating panel in the door
Options	There are no options available for the "Simplified version" design!

Type	Motor output	Output current	Dimensions in mm		
			Width	Depth (without door handle)	Height
ATV61ES5					
D90N4	90 kW	179 A	616	616	2359
C11N4	110 kW	215 A	616	616	2359
C13N4	132 kW	259 A	616	616	2359
C16N4	160 kW	314 A	616	616	2359
C22N4	220 kW	427 A	616	616	2359
C25N4	250 kW	481 A	816	616	2359
C31N4	315 kW	616 A	816	616	2359
C40N4	400 kW	759 A	1420	616	2359
C50N4	500 kW	941 A	1420	616	2359
C63N4	630 kW	1188 A	1620	616	2359

Frequency inverter standard enclosures



The concept of the Altivar enclosure units offers standard enclosures ready to connect. The modular construction makes it possible to adapt the enclosure to the individual requests. The economic enclosure version makes the planning easy and ensures a quick installation and commissioning of the drive.

Basic equipment of the Altivar enclosure units

The Altivar enclosure units are an extension to the Altivar frequency inverter offer. The basic equipment contains a frequency inverter ATV61 or ATV71, semiconductor fuses, a main switch, a choke to reduce the harmonics and terminals. The design is based on the enclosure system Sarel S6000 with the operating panel built-in into the door.

The control is located on a spacious swing frame. That ensures compact dimensions, nevertheless it is enough space for additional extensions and accessibility in case of maintenance.

Device features

Enclosure system

The Sarel S6000 enclosure system with additional internal reinforcement elements and slide bars for easy installation and removal of the inverter devices and other power components can be added to any existing enclosure systems.

Operation / parameterization

For safe control, clear parameterization and fast diagnosis, the operating panel is installed in the enclosure door at an ideal height. A transparent protective cover and an adjustable locking code prevent the unintended parameter adjustments.

Displays on the enclosure

Permanently present status displays that show the actual device state at any time.

Up to 5 analog actual values can be parameterized for the display and thus provide information on the relevant drive data at any time.

Connection

Generous space is provided to connect the power cables. The extensibility and accessibility of the control terminals is also taken into consideration.

In the standard design, the cables are to be connected at the bottom of the inverter.

Extensibility

All enclosure units are equipped with a large, swivelling control panel that permits subsequent extensions.

Enclosure design 400 V	
General technical data	
Mains voltage	400 (380, 415) V $\pm 10\%$, 50/60 Hz $\pm 5\%$ for TT, TN-C, TN-S or IT networks
Maximum current	120 % for 60 s per 10 minutes, 135 % for 2 seconds
Operating temperature	0 ... +40°C, up to +50°C with derating possible
Standards	CE, EMC filter for 2nd "industrial environment" C3 integrated
General design	Enclosure system Sarel S6000 in RAL 7032 Controls in the enclosure door with additional protective cover, Cable entry from below, enclosure depth 616 mm (659 mm incl. door handle)
Interfaces	Control terminals directly on the inverter or alternatively in the enclosure, control terminals can be extended, fieldbus connection via Modbus or CANopen

ATV61EXC●●●●N4 ATV61EXS5●●●●N4	
IP23CV Compact version	Air flow through grid in enclosure door and mounted air guidance hood, Enclosure height of 2159 mm
IP54CV Compact version	Air flow through filter mats in enclosure door and a top mounted fan, Enclosure height of 2264 mm
IP54SA with separated air flow	Air flow through enclosure plinth and mounted air guidance hood, cooling of the control part by means of filter fans in the enclosure door, enclosure height of 2359 mm (incl. 200 mm plinth)
Standard equipment	Frequency inverter ATV61, main switch, mains fuses, AC or DC choke, motor terminals, terminals for an external braking resistor (only ATV61EX●●D90N4 ... ATV61EX●●C22N4), control panel and operating panel in the door
Options	Line contactor, braking unit (from ATV61EX●●C25N4), motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more

ATV61EXA●●●●N4	
IP23 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm
IP54 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional filter fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm
Standard equipment	Frequency inverter ATV61, main switch, mains fuses, motor terminals, control panel and operating panel in the door
Options	Line contactor, line reactor, motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more

Type	Motor output	Output current	Dimensions in mm		
			Width	Depth (without door handle)	Height
ATV61EXC● ATV61EXS5					
D90N4	90 kW	179 A	616	616	IP23: 2159 mm
C11N4	110 kW	215 A	616	616	
C13N4	132 kW	259 A	616	616	
C16N4	160 kW	314 A	616	616	
C22N4	220 kW	427 A	616	616	
C25N4	250 kW	481 A	816	616	IP54: 2264 (2359) mm
C31N4	315 kW	616 A	816	616	
C40N4	400 kW	759 A	1016 (1420)	616	
C50N4	500 kW	941 A	1016 (1420)	616	
C63N4	630 kW	1188 A	1216 (1620)	616	
ATV61EXA●					
C63N4	630 kW	1100 A	1828	616	2004
C71N4	710 kW	1230 A	1828	616	2004
C90N4	900 kW	1580 A	3440	616	2004
M11N4	1100 kW	1860 A	3440	616	2004
M13N4	1300 kW	2200 A	3440	616	2004
M14N4	1400 kW	2430 A	3440	616	2004

Values in brackets for IP54SA with separated air flow

Enclosure design 500 V	
General technical data	
Mains voltage	500 (525) V $\pm 10\%$, 50/60 Hz $\pm 5\%$ for TT, TN-C, TN-S or IT networks
Maximum current	120 % for 60 s per 10 minutes, 135 % for 2 seconds
Operating temperature	0 ... +40°C, up to +50°C with derating possible
Standards	CE, EMC filter for 2nd "industrial environment" C3 integrated, at IT networks for C4
General design	Enclosure system Sarel S6000 in RAL 7032 Controls in the enclosure door with additional protective cover, Cable entry from below, enclosure depth 616 mm (659 mm incl. door handle)
Interfaces	Control terminals directly on the inverter or alternatively in the enclosure, control terminals can be extended, fieldbus connection via Modbus or CANopen

ATV61EXC●●●●N ATV61EXS5●●●●N	
IP23CV Compact version	Air flow through grid in enclosure door and mounted air guidance hood, Enclosure height of 2159 mm
IP54CV Compact version	Air flow through filter mats in enclosure door and a top mounted fan, Enclosure height of 2264 mm
IP54SA with separated air flow	Air flow through enclosure plinth and mounted air guidance hood, cooling of the control part by means of filter fans in the enclosure door, enclosure height of 2359 mm (incl. 200 mm plinth)
Standard equipment	Frequency inverter ATV61, main switch, mains fuses, AC or DC choke, motor terminals, terminals for an external braking resistor (only ATV61EX●●D90N...ATV61EX●●C16N), control panel and operating panel in the door
Options	Line contactor, braking unit (from ATV61EX●●C20N), motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more

ATV61EXA●●●●N	
IP23 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm
IP54 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional filter fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm
Standard equipment	Frequency inverter ATV61, main switch, mains fuses, motor terminals, control panel and operating panel in the door
Options	Line contactor, line reactor, motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more

Type	Motor output	Output current	Dimensions in mm		
			Width	Depth (without door handle)	Height
ATV61EXC● ATV61EXS5					
D90N	90 kW	136 A	616 (1020)	616	IP23: 2159 mm
C11N	110 kW	165 A	616 (1020)	616	
C13N	132 kW	200 A	616 (1020)	616	
C16N	160 kW	240 A	616 (1020)	616	
C20N	200 kW	312 A	816 (1220)	616	
C25N	250 kW	390 A	816 (1220)	616	
C31N	315 kW	462 A	816 (1220)	616	IP54: 2264 (2359) mm
C40N	400 kW	590 A	1216 (1620)	616	
C50N	500 kW	740 A	1216 (1620)	616	
C63N	630 kW	900 A	1216 (1620)	616	
ATV61EXA●					
C63N	630 kW	920 A	1828	616	2004
C80N	800 kW	1100 A	1828	616	2004
C90N	900 kW	1230 A	1828	616	2004
M11N	1100 kW	1580 A	3440	616	2004
M13N	1300 kW	1860 A	3440	616	2004
M15N	1500 kW	2140 A	3440	616	2004
M18N	1800 kW	2430 A	3440	616	2004

Values in brackets for IP54SA with separated air flow

Enclosure design 690 V

General technical data

Mains voltage	690 V ±10%, 50/60 Hz ±5 % for TT, TN-C, TN-S or IT networks
Maximum current	120 % for 60 s per 10 minutes, 135 % for 2 seconds
Operating temperature	0 ... +40°C, up to +50°C with derating possible
Standards	CE, EMC filter for 2nd "industrial environment" C3 integrated
General design	Enclosure system Sarel S6000 in RAL 7032 Controls in the enclosure door with additional protective cover, Cable entry from below, enclosure depth 616 mm (659 mm incl. door handle)
Interfaces	Control terminals directly on the inverter or alternatively in the enclosure, control terminals can be extended, fieldbus connection via Modbus or CANopen

ATV61EXC●●●●Y
ATV61EXS5●●●●Y

IP23CV Compact version	Air flow through grid in enclosure door and mounted air guidance hood, Enclosure height of 2159 mm
IP54CV Compact version	Air flow through filter mats in enclosure door and a top mounted fan, Enclosure height of 2264 mm
IP54SA with separated air flow	Air flow through enclosure plinth and mounted air guidance hood, cooling of the control part by means of filter fans in the enclosure door, enclosure height of 2359 mm (incl. 200 mm plinth)
Standard equipment	Frequency inverter ATV61, main switch, mains fuses, AC or DC choke, motor terminals, terminals for an external braking resistor (only ATV61EX●●D90Y...ATV61EX●●C22Y), control panel and operating panel in the door
Options	Line contactor, braking unit (from ATV61EX●●C25Y), motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more

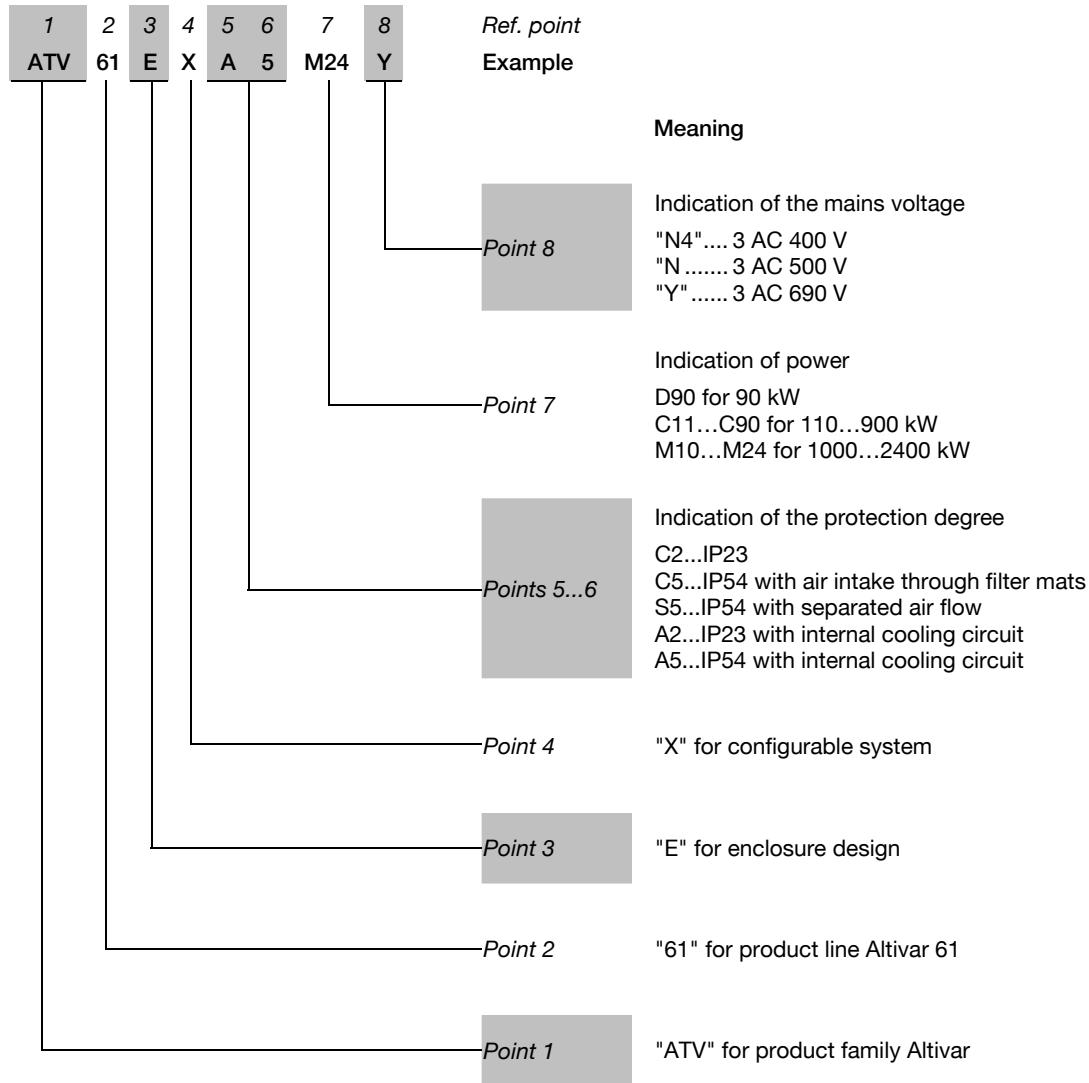
ATV61EXA●●●●Y

IP23 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm
IP54 with internal cooling circuit	Internal cooling circuit for cooling of the power part with heat exchange in a separate cooling enclosure, additional filter fans in the enclosure door for incoming and outgoing enclosure, enclosure height 2004 mm
Standard equipment	Frequency inverter ATV61, main switch, mains fuses, motor terminals, control panel and operating panel in the door
Options	Line contactor, line reactor, motor choke, terminal extensions, fieldbus, emergency stop button, safe standstill (control category 3 according to EN 954-1 / ISO 13849-1 for "Safe Standstill" (stop category 0 or 1)), enclosure lighting, enclosure heating, and much more

Type	Motor output	Output current	Dimensions in mm		
			Width	Depth (without door handle)	Height
ATV61EXC● ATV61EXS5					
C11Y	110 kW	125 A	616 (1020)	616	IP23: 2159 mm
C13Y	132 kW	150 A	616 (1020)	616	
C16Y	160 kW	180 A	616 (1020)	616	
C20Y	200 kW	220 A	616 (1020)	616	
C25Y	250 kW	290 A	816 (1220)	616	
C31Y	315 kW	355 A	816 (1220)	616	IP54: 2264 (2359) mm
C40Y	400 kW	420 A	816 (1220)	616	
C50Y	500 kW	543 A	1216 (1620)	616	
C63Y	630 kW	675 A	1216 (1620)	616	
C80Y	800 kW	840 A	1216 (1620)	616	
ATV61EXA●					
C80Y	800 kW	840 A	1828	616	2004
M10Y	1000 kW	1050 A	1828	616	2004
M12Y	1200 kW	1230 A	1828	616	2004
M15Y	1500 kW	1580 A	3440	616	2004
M18Y	1800 kW	1860 A	3440	616	2004
M21Y	2100 kW	2140 A	3440	616	2004
M24Y	2400 kW	2430 A	3440	616	2004

Values in brackets for IP54SA with separated air flow

The product designation of the Altivar frequency inverters consists of several points of reference (characters and figures). The meaning of each point is illustrated in the following example.



Order process for standard enclosures "Configured drive systems"

1. Choose the standard enclosure on the basis of the voltage, the power and the protection degree first.
e.g. mains voltage: 400 V; motor power: 315 kW; protection degree IP54 compact

-	1x ATV61EXC5C31N4	Standard enclosure in protection degree IP54 compact
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2. Now you can select the desired options, which should be installed into the enclosure in the factory, by means of the option lists.

-	1x VW3 AE 0104	Door handle for main switch
---	----------------	-----------------------------

-	1x VW3 AE 1601	Enclosure lighting
---	----------------	--------------------



Some options affect the dimensions of the enclosure. Please observe chapter "Width of the cubicle", page 179 for this purpose.

3. List the enclosure unit including the respective options in the order:

-	1x ATV61EXC5C31N4	Standard enclosure in protection degree IP54 compact
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-	1x VW3 AE 0104	Door handle for main switch
---	----------------	-----------------------------

-	1x VW3 AE 1601	Enclosure lighting
---	----------------	--------------------



Specify only one standard enclosure including the respective options per order! Otherwise the assignment of the options to be installed is not possible!



Enclosure options cannot be ordered on its own! This is only possible in combination with a standard enclosure!

4. When you want to order the same enclosure configuration several times, you can simply multiply the individual positions.

-	3x ATV61EXC5C31N4	Standard enclosure in protection degree IP54 compact
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-	3x VW3 AE 0104	Door handle for main switch
---	----------------	-----------------------------

-	3x VW3 AE 1601	Enclosure lighting
---	----------------	--------------------

Request and order of "Flexible drive systems" enclosures

For all orders which contain "Options on request" or special options, proceed as follows.

1. Choose the standard enclosure on the basis of the voltage, the power and the protection degree.
e.g.: mains voltage: 690 V; motor power: 2400 kW; protection degree IP54 with internal cooling circuit

– 1x ATV61EXA5M24Y	Standard enclosure in protection degree IP54 with internal cooling circuit
--------------------	--

2. Now you can select the desired options, which should be installed into the enclosure afterwards, by means of the option lists.
Additionally specify your requests.

– 1x VW3 AE 1601	Enclosure lighting
– 1x VW3 AE 2420	12-pulse supply
– 1x <i>on request</i>	Special colour RAL7035 "Light grey"
– 1x <i>on request</i>	Cable entry via the top



Some options affect the dimensions of the enclosure. Please observe chapter "Width of the cubicle", page 179 for this purpose.

3. List the enclosure unit including the respective options for the request. Send this request to Schneider Electric Power Drives.

– 1x ATV61EXA5M24Y	Standard enclosure in protection degree IP54 with internal cooling circuit
– 1x VW3 AE 1601	Enclosure lighting
– 1x VW3 AE 2420	12-pulse supply
– 1x <i>on request</i>	Special colour RAL7035 "Light grey"
– 1x <i>on request</i>	Cable entry via the top



Specify additionally the requirements for the special design in the request!

4. You will receive a quotation with a quotation number (e.g. VA-1002-09A-AL) including transfer price (net price), delivery time, terms of delivery and technical descriptions to the individual positions.

5. Please always quote in the order "ATVCBL" as reference. Add the quotation number and the position in the description.

– 1x ATVCBL	as per quotation number VA-1002-09A-AL (position 1)
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It is absolutely necessary to quote the position in addition to the quotation number so that the amount of the order is well-defined!

Altivar 61 Plus

General specification

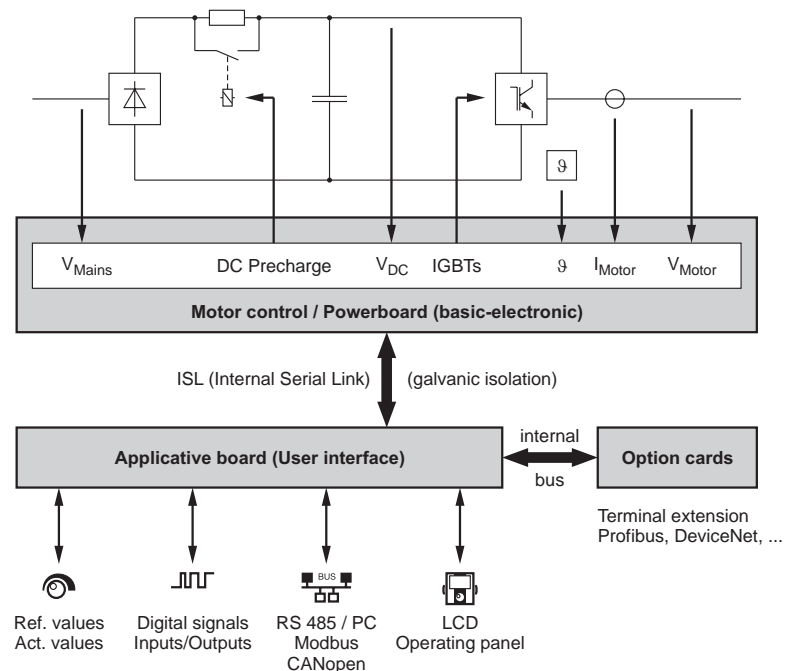
Altivar frequency inverters use modern components and solutions for the control of asynchronous three-phase motors and synchronous three-phase motors. This enables an extremely compact design and userfriendly device features.

Our high degree of quality awareness ranges from the basic requests in the product specification over the development of the cooling system, of the mechanical design, of the electrical circuit diagram and the individual functions up to the production of the device. This quality level is also long-term guaranteed by means of the corresponding quality assurance systems in the individual business processes and is certified every year by independent authorities according to DIN EN ISO 9001.

The range of Altivar 61 frequency inverters has been developed especially for applications in the area of industrial and commercial buildings (ventilation, air conditioning and pump technology). Due to the integrated energy saving function a reduction of the operating costs is permitted by improved power consumption.

The Altivar 71 is equipped with several motor control methods and numerous integrated functions. Thus it meets the highest demands in industry, machine building and automation.

Altivar frequency inverters are independent working devices with internal supply of the control and forced ventilation. They feature alternatively an integrated LED operating panel or a removable operating panel with large LCD display and extensive control terminals.



Depending on the local conditions and the requests on the drive the basic device can or must be supplemented by options. Options for the power path, options for control and operation as well as mechanical options are available.

Altivar frequency inverters fulfil the relevant international standards and regulations of the EN-standard, IEC-standards up to UL and CSA regulations.

CE Marking

All devices and drives of the electric drive engineering may cause electromagnetic interferences and otherwise they may be influenced by such interferences. Therefore, they are subject to the **EMC directive 2004/108/EC** since 1.1.1996.

The frequency inverters have an operating voltage which is clearly in the range of 50...1000 V AC or 75...1500 V DC. Therefore, they are also subject to the **Low-voltage directive 2006/95/EC** since 1.1.1997.

Because of the EMC filters which are built into the frequency inverters they are in conformity with **EN 61800-3** and **EN 61800-5-1**.

Frequency inverters are not considered as machines with at least one mechanically moving part. Therefore, they are not subject to the Machine directive 2006/42/EC.



Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

The frequency inverters have a CE marking on the rating plate. However, it is necessary to observe the installation regulations to achieve the corresponding limits.

Installation regulations

- The frequency inverters have a basic radio frequency interference filter for grounded mains built-in.
- Take care of good HF connection between motor cable screen and filter.
- Use of screened motor cables, proper connection of the motor cables on both ends or proper laying in a metallic, closed and interconnected cable conduit
- Use of a motor choke in case of high motor cable lengths
- Use and proper connection of screened control cables
- Grounding of the frequency inverter for human protection
- Consider the protective separation when preparing control lines and coupling relays
- Laying of the motor cables separated from other cables, especially from the control wiring

Machine safety

The function "Safe Standstill" (page 152) is available as selectable option in various safety and stop categories. So an optimal adaptation of the drive to the required safety category for the machine is possible.

Following variants of the option "Safe Standstill" are selectable:

- **Safety category 1 with stop category 0**
alternatively with line contactor or safety input at the inverter
- **Safety category 3 with stop category 0**
with Preventa safety relay
- **Safety category 3 with stop category 1**
with Preventa safety relay and monitored deceleration of the drive



For all selectable safety options the implementation of external safety-relevant contacts is provided. So the ATV61 Plus does not act as a closed safety system in terms of the Machine directive and safety standards EN/IEC 61508, EN 954-1, ISO 13849-1 and NF EN 62061. It has to be accounted as component in any case. The safety-relevant components which are installed in the ATV61 Plus and their safety-relevant functionality have to be included in the whole machine safety by the engine builder.

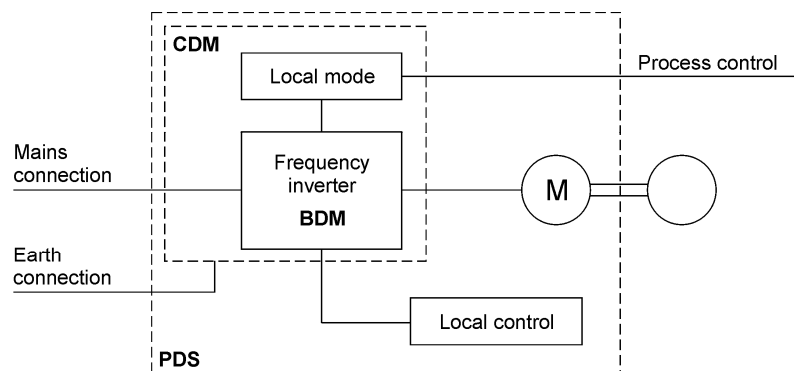
EMC product standard for PDS (Power Drive Systems) EN 61800-3

For frequency inverter drives the product standard EN/IEC 61800-3 edition 1 and 2 appeared. It has first priority over the existing general standards (generic standards). If a drive is installed into another device for which a separate EMC product standard exists, then this standard applies.

The aim of the **EMC directive 2004/108/EEC** is the ability of electric and electronic installations to operate satisfactorily in their electromagnetic environment without influencing the environment or other loads therein.

Therefore, the PDS product standard contains both limits for admissible interferences and requirements for the necessary interference resistance.

The power drive standard EN 61800-3 covers the complete drive from the mains supply to the motor shaft.



BDM:	Base-Drive-Module	Basic drive consisting of the power part and the control electronics (e.g. frequency inverter - built-in unit)
CDM:	Complete-Drive-Module	Drive modules consisting of BDM (basic drive) and extensions, if existing (e.g. enclosure including EMC filter, motor choke, line contactor, ...)
PDS:	Power-Drive-System	Drive system consisting of CDM (drive module) and motor, motor cable, local control, power transformer, ... (e.g. the complete electric drive of a machine)

The differentiation in respect of the sales method and the range of use is essential for the handling of frequency inverters.

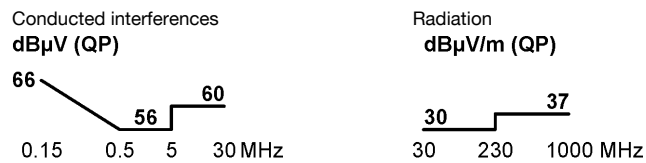
Use in residential environment

Drives that are connected without an intermediate transformer to the power supply network which also supplies residential areas. The standard refers to these application areas as "first environment".

The valid limits for interferences are very low and can only be observed by compliance with all installation instructions.

Category C1

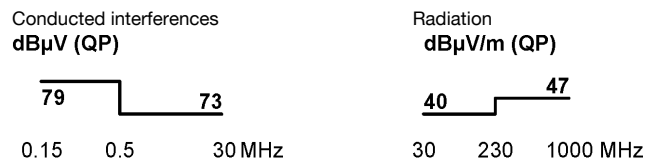
Use in residential environments with general sales (unrestricted to every person)



The admissible limits for interferences comply with the applied standard EN 55011 class B; i.e. 66-56/56/60 dB(μ V) quasi-peak and 30/37 dB(μ V/m) at a distance of 10 m.

Category C2

Use in residential environments with restricted sales (only EMC qualified resellers)



All drives must comply with the limits of interferences of the former class A group 1.

i.e. 79/73/73 dB(μ V) quasi-peak and 40/47 dB(μ V/m) at a distance of 10 m

Use in industrial environment

The standard refers to these application areas as "second environment". These are areas that are separated from the public network by means of an own transformer. The user must ensure that the suppression components recommended by the manufacturer are used and that the introductions of the manufacturer are observed. Moreover, the user must ensure that strong interferences do not couple into neighbouring low-voltage networks.

If the neighbouring network is a public network with residential areas, the limits 66-56/56/60 dB(μ V) quasi-peak apply. In case of industrial networks the higher limits 79/73/73 dB(μ V) quasi-peak can be used.

Furthermore, it is necessary to enhance the suppression of interferences if other devices are influenced. The operator of the plant is responsible for this improvement.

The limits for immunity are much stricter because they are based on a generally higher level of interferences.

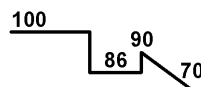
Category C3

Use in industrial environments

Conducted interferences

drive \leq 100 A

dB μ V (QP)



0.15 0.5 5 30 MHz

Radiation

dB μ V/m (QP)



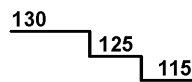
30 230 1000 MHz

For drives with a size \leq 100 A the admissible limits for interferences are 100/86/90-70 dB(μ V) quasi-peak and 50/60 dB(μ V/m) at a distance of 10 m (class A group 2).

Conducted interferences

drive $>$ 100 A

dB μ V (QP)



0.15 0.5 5 30 MHz

Radiation

dB μ V/m (QP)



30 230 1000 MHz

For drives with a size $>$ 100 A the admissible limits for interferences are 130/125/115 dB(μ V) quasi-peak and 50/60 dB(μ V/m) at a distance of 10 m (class A group 2).

Category C4

Use in industrial environments for drives $>$ 1000 V or $>$ 400 A

For these drives are no limits defined. An EMC concept has to be compiled within project planning.

In case of non-grounded mains it is usually not possible to keep the limits. Filter capacitors make detection of insulation faults difficult and thus they interfere with the concept of a floating power supply. However, filters that are developed especially for IT mains can be used because they also cause a high reduction of the conducted interferences in non-grounded mains.



The basic requirements for compliance with the relevant limits are the observance and compliance of the installation requirements and the use of the recommended options.

Mains voltage

The Altivar devices are designed for the following mains voltages:

- ATV61ES5●●●N4: 3 AC 400 (380, 415) V \pm 10 %, 50/60 Hz \pm 5 %
- ATV61EX●●●●N4: 3 AC 400 (380, 415) V \pm 10 %, 50/60 Hz \pm 5 %
- ATV61EX●●●●N: 3 AC 500 (525) V \pm 10 %, 50/60 Hz \pm 5 %
- ATV61EX●●●●Y: 3 AC 690 V \pm 10 %, 50/60 Hz \pm 5 %

The existing nominal mains voltage must be set at the inverter by means of a parameter. Thereby an optimal adjustment of the undervoltage protective function takes place.

Braking unit / Braking resistor

The Altivar frequency inverters have parameters to monitor the braking power.



If the braking resistor does not match the overload characteristic to be used or the local regulations require an additional protective device, a thermal relay should be integrated into the mains disconnection mechanism.

The correct setting of the braking parameters is essential for the protection of the braking resistor in normal operation. In case of malfunction of the internal braking transistor or of the external braking unit, the braking resistor can be only protected by mains disconnection. Therefrom, a line contactor is necessary when using the braking function. Furthermore, the use of the function "Line contactor control" is recommended.

Nongrounded mains

The use of the Altivar frequency inverters is basically in all network variants permitted. But the Altivar frequency inverters with a mains voltage of 500 V or 690 V must not be operated in "Corner Grounded Networks".

With the option "Design for IT networks" (page 155) the frequency inverter is prepared for connection to non-grounded networks.

In case of nongrounded networks a single earth fault in the supplying mains has no effect to the function of the inverter. If the earth fault occurs in the motor or the motor cables, the inverter is switched off. But the recognition heavily depends on the earth capacitance of the mains.



Especially for IT networks the option "Insulation monitoring for IT networks" is available. This option monitors each phase to earth fault. See page 155.



Due to human protection, in IT networks only the use of special RFI filters with very low leakage current is permitted (increase of earth capacitance, ...).

Radio interferences

The frequency inverters include an EMC filter built-in as standard. This filter complies with the requirements for category "C3 – Industrial environments" according EN/IEC 61800-3 (in the past: EN 55011 class A group 2).

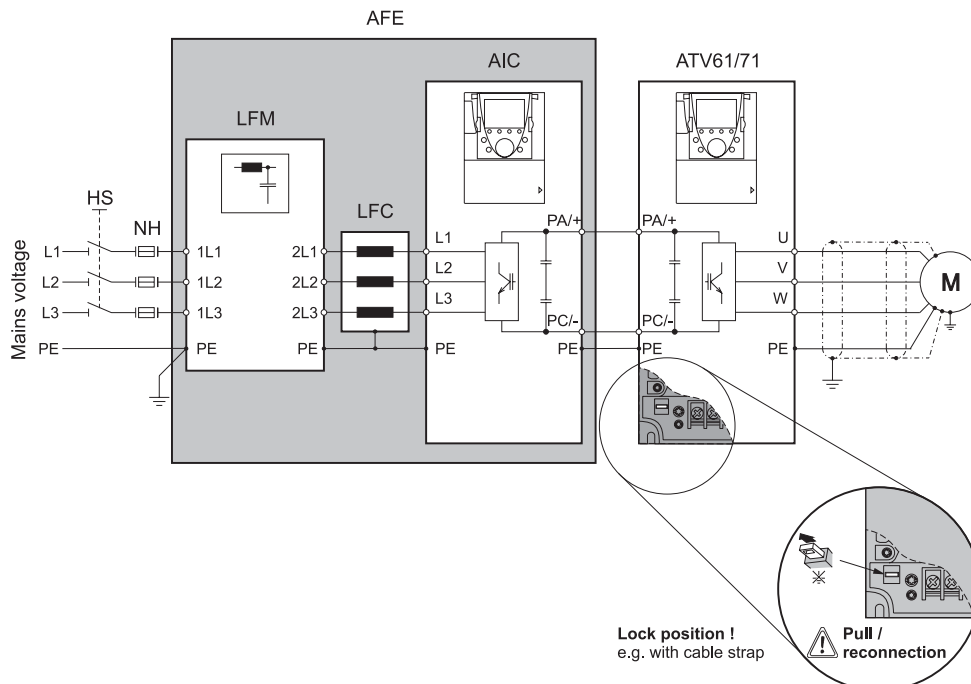


Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

Operation in combination with an active front end

It is absolutely necessary to carry out the following settings for all frequency inverters connected to an Active Front End:

- **RFE** [Regen. connection] in menu [1.7 APPLICATION FUNCT.] (FU-)
in submenu [REGEN. CONNECTION] (Olr-)
Setting: [Yes] (YES)
Thereby the undervoltage level of the frequency inverter is adapted to the operation with the Active Front End.
Please contact our service team if this parameter is not available in the parameter list of your device!
- **brR** [Braking balance] in menu [1.7 APPLICATION FUNCT.] (FU-)
in submenu [RAMP TYPE] (rPt-)
Setting: [No] (nO)
- **dEL** [Deceleration] in menu [1.7 APPLICATION FUNCT.] (FU-)
in submenu [RAMP TYPE] (rPt-)
For dynamic processes a very short deceleration ramp can cause an overload on the DC-bus with an overvoltage fault shut-down.
This can be prevented by an extension or rounding of the deceleration ramp (parameters *LAR* [Begin Dec round]; *LAR* [End Dec round]).
- **UrES** [Mains voltage] in menu [1.8 FAULT MANAGEMENT] (FLt-)
in submenu [UNDERVOLTAGE MGT.] (USb-)
Same setting as the Active Front End.
Thereby the internal voltage levels of the frequency inverter are adapted.
- **IPL** [Input phase loss] in menu [1.8 FAULT MANAGEMENT] (FLt-)
in submenu [INPUT PHASE LOSS] (OPL-)
Setting: [Ignore] (nO)
- **bUB** [Brake res. fault Mgt] in menu [1.8 FAULT MANAGEMENT] (FLt-)
in submenu [BU PROTECTION] (bUF-)
Setting: [Ignore] (nO)
- **LEL** [2 wire type] in menu [1.5 INPUTS/OUTPUTS CFG] (I-O-)
Setting: [Level] (LEL)
In order to ensure an automatic restart by the AFE after an undervoltage recognition. An automatic restart only possible with 2-wire control.
- **RFI filter**
The integrated RFI filter has to be deactivated (position IT, non-grounded mains) at all devices because there exists no direct mains connection of the frequency inverter in case of operation with an Active Front End.



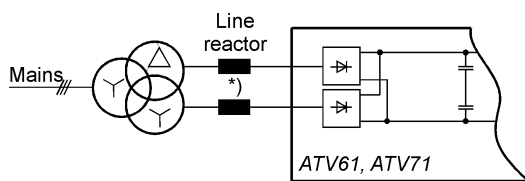
12-pulse supply

The frequency inverters of the enclosure units ATV61EXA●●●●● are standard equipped with two parallel input rectifiers. Thus it is easy to equip them with 12-pulse rectification optionally.

The supply results from a separate transformer with two out-of-phase secondary windings (e.g. superimposing transformer Yy6 Yd5).

If the existing mains distortion is mainly caused by frequency inverters with normal 6-pulse-circuit, a superimposing transformer in zig-zag-connection ($\pm 15^\circ$ phase shift at each secondary windings e.g. Yy1130 Yy0030) will be highly recommended.

On the main side of the transformer the 5th and 7th current harmonics are practically non-existent as they have been cancelled by the shifted transformer windings.



*) Line reactors are only necessary if a transformer is used for several inverters or if the transformer power is notably larger than the inverter power (see chapter "Mains impedance / Short-circuit current", page 28).

The following specifications must be kept at a minimum in order to ensure trouble-free operation and even current sharing:

Transformer:

- Converter transformer for 12-pulse supply with two non-controlled rectifier bridges in a common voltage DC link.
- Recommended design: superimposing
- Nominal voltage at the primary side: according to application
- Voltage adaptation at the primary side: +5% / +2.5% / 0 / -2.5% / -5%
- Nominal output current: see the following table
- Current harmonics at the secondary side: see the following table
- Nominal output voltage (= no-load voltage): see the following table
- Tolerance of the secondary voltages to each other: $< 0.3\%$ ($< 0.1\%$) of V_{NOM}
- Short circuit voltage: see the following table
- Tolerance of the relative short circuit voltage: $\pm 10\%$ of v_{SC_NOM}
- Tolerance of the relative short circuit voltage between both secondary windings: $< 5\%$ ($< 2\%$) of v_{SC_NOM}
- Further specifications: according to the application
- Tolerance for unbalance of phaseshift ($\pm 0.5^\circ$)

Mains:

- allowed mains distortion: $THD(u) < 5\%$
- max. single harmonic (5th): $< 3\%$

() Values in brackets for transformer in zig-zag-connection ($\pm 15^\circ$ phase shift at both secondary windings e.g. Yy1130 Yy0030)

Recommended values for dimensioning a "12-pulse transformer"									
Inverter power [kW]	Transformer			Inverter power [HP]	Transformer		Hamonics Secondary (THDi LV)	Short-circuit voltage	Hamonics Primary (THDi HV)
	Output current 400V	Output current 500V	Output current 690V		Output current 480V	Output current 600V			
90	2x 90 A	2x 70 A	2x 60 A	125	2x 80 A	2x 65 A	42 %	4 %	12 %
110	2x 110 A	2x 80 A	2x 65 A	150	2x 95 A	2x 75 A	42 %	4 %	12 %
132	2x 130 A	2x 95 A	2x 75 A	200	2x 125 A	2x 115 A	42 %	4 %	12 %
160	2x 155 A	2x 120 A	2x 90 A	250	2x 155 A	2x 140 A	42 %	4 %	12 %
200	2x 190 A (2x 175 A)	2x 145 A (2x 140 A)	2x 120 A (2x 100 A)	300	2x 185 A (2x 170 A)	2x 160 A (2x 140 A)	42 %	4 %	12 %
220	2x 210 A (2x 195 A)	2x 160 A (2x 150 A)	2x 130 A (2x 110 A)	350	2x 215 A (2x 185 A)	2x 175 A (2x 160 A)	42 %	4 %	12 %
250	2x 240 A (2x 215 A)	2x 180 A (2x 175 A)	2x 145 A (2x 130 A)	400	2x 245 A (2x 220 A)	2x 200 A (2x 180 A)	42 %	4 %	12 %
280	2x 265 A (2x 240 A)	2x 205 A (2x 195 A)	2x 160 A (2x 145 A)	450	2x 275 A (2x 245 A)	2x 225 A (2x 200 A)	42 %	4 %	12 %
315	2x 300 A (2x 275 A)	2x 230 A (2x 215 A)	2x 180 A (2x 160 A)	500	2x 305 A (2x 275 A)	2x 250 A (2x 225 A)	42 %	4 %	12 %
355	2x 340 A (2x 310 A)	2x 250 A (2x 245 A)	2x 210 A (2x 180 A)	550	2x 330 A (2x 310 A)	2x 275 A (2x 255 A)	42 %	4 %	12 %
400	2x 380 A (2x 355 A)	2x 285 A (2x 275 A)	2x 230 A (2x 200 A)	600	2x 365 A (2x 330 A)	2x 290 A (2x 270 A)	42 %	4 %	12 %
500	2x 490 A (2x 455 A)	2x 385 A (2x 360 A)	2x 285 A (2x 255 A)	700	2x 420 A (2x 390 A)	2x 340 A (2x 315 A)	35 %	6 %	10 %
560	2x 550 A (2x 510 A)	2x 440 A (2x 410 A)	2x 320 A (2x 275 A)	800	2x 480 A (2x 440 A)	2x 395 A (2x 370 A)	35 %	6 %	10 %
630	2x 610 A (2x 565 A)	2x 490 A (2x 460 A)	2x 365 A (2x 335 A)	900	2x 540 A (2x 500 A)	2x 430 A (2x 400 A)	35 %	6 %	10 %
710	2x 680 A (2x 630 A)	2x 540 A (2x 505 A)	2x 420 A (2x 385 A)	1000	2x 600 A	2x 480 A (2x 445 A)	35 %	6 %	10 %
800	2x 770 A (2x 710 A)	2x 610 A (2x 570 A)	2x 465 A (2x 430 A)	1150	–	2x 540 A (2x 505 A)	35 %	6 %	10 %
900	2x 860 A (2x 800 A)	2x 685 A (2x 635 A)	2x 525 A (2x 485 A)	1250	–	2x 590 A (2x 550 A)	35 %	6 %	10 %
1000	2x 940 A (2x 870 A)	2x 770 A (2x 710 A)	2x 570 A (2x 525 A)	1400	–	2x 660 A (2x 615 A)	35 %	6 %	10 %
1100	2x 1040 A (2x 960 A)	2x 840 A (2x 780 A)	2x 620 A (2x 575 A)	1600	–	2x 755 A (2x 705 A)	35 %	6 %	10 %
1200	2x 1110 A (2x 1030 A)	2x 900 A (2x 840 A)	2x 665 A (2x 620 A)	1700	–	2x 790 A (2x 740 A)	35 %	6 %	10 %
1300	2x 1200 A (2x 1120 A)	2x 980 A (2x 910 A)	2x 725 A (2x 670 A)	1900	–	2x 885 A (2x 825 A)	35 %	6 %	10 %
1400	2x 1300 A (2x 1200 A)	2x 1050 A (2x 980 A)	2x 780 A (2x 720 A)	2000	–	2x 930 A (2x 865 A)	35 %	6 %	10 %
1500	–	2x 1120 A (2x 1040 A)	2x 840 A (2x 770 A)	2100	–	2x 980 A (2x 905 A)	35 %	6 %	10 %
1800	–	2x 1330 A (2x 1230 A)	2x 1000 A (2x 920 A)	2200	–	2x 1020 A (2x 950 A)	35 %	6 %	10 %
2000	–	–	2x 1100 A (2x 1000 A)	2500	–	2x 1150 A (2x 1070 A)	35 %	6 %	10 %
2100	–	–	2x 1150 A (2x 1050 A)	–	–	–	35 %	6 %	10 %
2400	–	–	2x 1300 A (2x 1200 A)	–	–	–	35 %	6 %	10 %

() Values in brackets for transformer in zig-zag-connection ($\pm 15^\circ$ phase shift at both secondary windings e.g. Yy1130 Yy0030)

Recommended output voltage for the transformer

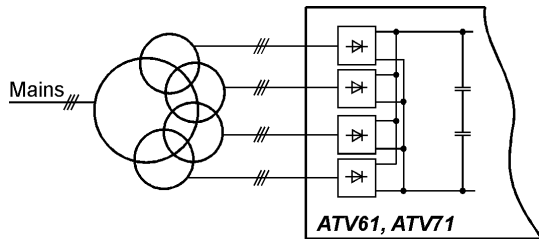
The nominal output voltage of a transformer is specified at no load operation. Therefore this value should be 3...5 % higher than the rated voltage of the drive.

Inverter	Transformer output voltage phase / phase (no load)						
	Nominal voltage 380V	Nominal voltage 400V	Nominal voltage 440V	Nominal voltage 480V	Nominal voltage 500V	Nominal voltage 600V	Nominal voltage 690V
400 V range	400V	425V	460V	500V	–	–	–
690 V range	–	–	–	–	525V	630V	715V

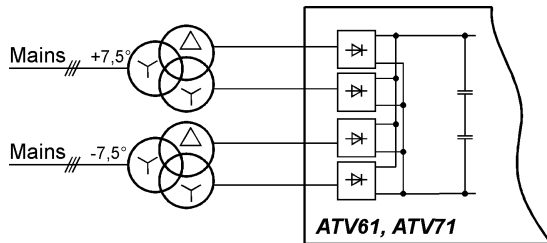
24-pulse supply

The frequency inverters of the following enclosure units are standard equipped with four parallel input rectifiers. Thus it is easy to equip them with 24-pulse rectification optionally:

- from ATV61EXA●C90N4
- from ATV61EXA●M11N
- from ATV61EXA●M15Y



The supply results from a separate transformer with four secondary windings each separated by 15°.



Alternatively the supply can also occur via two transformers each with two out-of-phase secondary windings (e.g. superimposing transformer Yy6 Yd5) and a phase displacement of +7.5° and -7.5° at the primary winding.

The symmetry of the two transformers is a major factor for reducing the harmonics.

On the medium voltage line the 5th, 7th, 11th, 13th, 17th and 19th current harmonics are practically non-existent as they have been cancelled by the shifted transformer windings.

The following specifications must keep at a minimum in order to ensure trouble-free operation and even current sharing:

Transformer:

- Converter transformer(s) for 24-pulse supply with four non-controlled rectifier bridges in a common voltage DC link.
- Recommended design: superimposing
- Nominal voltage at the primary side: according to application
- Voltage adaptation at the primary side: +5% / +2.5% / 0 / -2.5% / -5%
- Nominal output current: see the following table
- Current harmonics at the secondary side: see the following table
- Nominal output voltage (= no-load voltage): see the following table
- Tolerance of the secondary voltages to each other: < 0.3% (< 0.1%) of V_{NOM}
- Short circuit voltage: see the following table
- Tolerance of the relative short circuit voltage: $\pm 10\%$ of v_{SC_NOM}
- Tolerance of the relative short circuit voltage between both secondary windings: < 5% (< 2%) of v_{SC_NOM}
- Further specifications: according to the application
- Tolerance for unbalance of phaseshift: ($\pm 0.5^\circ$)

Mains:

- allowed mains distortion: THD(u) < 5%
- max. single harmonic (5th): < 3%

() Values in brackets for transformer in zig-zag-connection ($\pm 15^\circ$ phase shift at both secondary windings e.g. Yy1130 Yy0030)

Recommended values for dimensioning a "24-pulse transformer"									
Inverter power [kW]	Transformer			Inverter power [HP]	Transformer		Transformer Harmonics Secondary (THDi LV)	Short-circuit voltage	Transformer Harmonics Primary (THDi HV)
	Output current 400V	Output current 500V	Output current 690V		Output current 480V	Output current 600V			
710	4x 350 A (4x 320 A)	–	–	1000	4x 310 A (4x 280 A)	–	35 %	6 %	10 %
900	4x 440 A (4x 400 A)	4x 350 A (4x 320 A)	–	1250	4x 400 A (4x 360 A)	4x 300 A (4x 280 A)	35 %	6 %	10 %
1100	4x 530 A (4x 480 A)	4x 430 A (4x 390 A)	–	1600	4x 480 A (4x 440 A)	4x 390 A (4x 360 A)	35 %	6 %	10 %
1200	–	–	4x 340 A (4x 320 A)	1800	4x 550 A (4x 500 A)	–	35 %	6 %	10 %
1300	4x 620 A (4x 570 A)	4x 500 A (4x 460 A)	–	1900	–	4x 450 A (4x 420 A)	35 %	6 %	10 %
1400	4x 675 A (4x 610 A)	–	–	2000	4x 620 A (4x 560 A)	–	35 %	6 %	10 %
1500	–	4x 530 A (4x 520 A)	4x 430 A (4x 390 A)	2100	–	4x 500 A (4x 460 A)	35 %	6 %	10 %
1800	–	4x 675 A (4x 620 A)	4x 510 A (4x 460 A)	2200	–	4x 520 A (4x 480 A)	35 %	6 %	10 %
2000	–	–	4x 560 A (4x 500 A)	2500	–	4x 590 A (4x 540 A)	35 %	6 %	10 %
2100	–	–	4x 585 A (4x 530 A)	–	–	–	35 %	6 %	10 %
2400	–	–	4x 660 A (4x 600 A)	–	–	–	35 %	6 %	10 %

1) THDi for each transformer

() Values in brackets for transformer in zig-zag-connection ($\pm 15^\circ$ phase shift at both secondary windings e.g. Yy1130 Yy0030)

Recommended output voltage for the transformer

The nominal output voltage of a transformer is specified at no load operation. Therefore this value should be 3...5 % higher than the rated voltage of the drive.

Inverter	Transformer output voltage phase / phase (no load)						
	Nominal voltage 380V	Nominal voltage 400V	Nominal voltage 440V	Nominal voltage 480V	Nominal voltage 500V	Nominal voltage 600V	Nominal voltage 690V
400 V range	400V	425V	460V	500V	–	–	–
690 V range	–	–	–	–	525V	630V	715V

Mains current harmonics / Mains voltage distortion

Because of using a diode rectifier on the input of the inverter harmonics occur in the mains current which lead to a voltage distortion of the supplying mains.

There are DC chokes or line reactors available for the enclosure unit in order to reduce these current harmonics and to decrease the total mains current.

Mains impedance / Short-circuit current

The frequency inverters are designed considering a maximal permitted mains short-circuit current of the supply (values see technical data of the respective frequency inverter).



Optionally the devices can be also designed for higher mains short-circuit currents.

Power factor correction systems

Frequency inverters cause current harmonics in the supplying mains. When a power factor correction system is used, their capacitors are additionally stressed by means of the harmonics.



To protect against overload, we recommend the installation of chokes for those parts.

Switching rate

Altivar frequency inverters can be directly switched on and off by means of the line contactor which can be easily controlled via a relay output of the inverters.

In case of frequent start/stop commands it is recommended to realize them by means of the logic control inputs (or via a serial bus) directly to the electronics of the inverter.



By means of the certificated control input "PWR" a "Safe Standstill" of the drive is guaranteed considering the safety category according to EN 954-1 / ISO 13849-1 (and IEC/EN 61800-5-2). Thus a line or motor contactor can be saved.

Inverter control	Switching rate
The inverter is controlled by means of connecting and disconnecting the line supply voltage.	max. 60 switching operations per hour (safety category 1, stop category 0)
Electronic start/stop commands by means of the logic inputs of the inverter	arbitrary
Electronic lock of the inverter by means of the control input PWR "Safe Standstill"	arbitrary (safety category 3, stop category 0 or 1)

Responsibility



The users are responsible to integrate the frequency inverters into the protection and safety concept of the plant or machine.

All stated connection recommendations and planning remarks are to be taken merely as suggestions which must be adapted to the local conditions and regulations concerning installation and usage.

This applies especially to the safety regulations for machines, the EMC regulations and the general regulations for human protection.

Frequencies > 60 Hz



For operating the motors and drives with frequencies higher than 60 Hz check all used components whether they are also qualified.

You should ask the manufacturer of the motor and the machine on principle. Typically, 4- to 8-pole motors are qualified for operation up to 100 Hz.

Overvoltage protective circuit



All inductivities like relays, contactors, magnetic brakes, etc. have to be equipped with an overvoltage protective circuit. It prevents malfunctions of the conventional device control as well as of the fieldbus.

A free-wheeling diode is provided for DC control circuits.

For AC control circuits the R/C wiring is preferable compared to a wiring with varistors because as a result not only the peak overvoltage is reduced but also the rise-time.



The protective circuit must be qualified for inverter operation !

Earth leakage circuit breaker

Frequency inverters, especially those with additional EMC filters and screened motor cables, lead an increased leakage current against earth.

The leakage current depends on:

- the length of the motor cable
- the type of laying and whether the motor cable is screened or not
- the set pulse frequency
- the use of an additional EMC filter
- the grounding of the motor at its installation place (grounded or non-grounded))



Particularly because of the capacitors of the filter, an unintentional triggering of an earth leakage circuit breaker may occur at the moment of switching on. As well, the earth capacitances may cause an incorrect triggering during operation.

On the other hand, it is possible that the triggering is blocked by means of DC components which are caused by the mains rectification at the input of the inverter.

Therefrom, you should observe following:

- Only use short-time delayed and pulse current sensitive earth leakage circuit breakers with considerably higher tripping current.
- Protect the other loads by means of a separate earth leakage circuit breaker.
- Earth leakage circuit breakers in front of an inverter do not provide absolutely reliable protection in case of direct contact !! So they should be always used in combination with other protective measures.
- The frequency inverters have no current-limiting effect (in case of earth leakage currents) and therefore they do not violate the protective multiple earthing.

Depending on the conditions, the leakage current of plants with high cable lengths can be absolutely higher than 100 mA !!



The built-in earth leakage detection has no current-limiting effect. It only protects the drive and is no human protection.

Automatic restarting

The internal function "automatic restart" switches the inverter automatically on after each mains switch-on or mains recurrence without the power failure having to be confirmed. This is an important and valuable function for the increase in availability, especially for drives that are not integrated into the plant control via a fieldbus system.

The automatic restart takes place in case of:

- Switch-on of the line supply voltage (only in case of 2-wire control and dependent on the selected undervoltage behaviour)
- after a mains failure (only in case of 2-wire control and dependent on the selected undervoltage behaviour)
- completion of the standby-mode
- after each trip confirmation (only in case of 2-wire control – level rated)
- after a fast stop or emergency stop (only in case of 2-wire control – level rated)

Locking of the frequency inverter

The ATV61 devices include the standard protective function "Safe Standstill" ("Power Removal") which prevents any unintended start-up of the motor. This function fulfills, when correctly wired, the machine standard EN 954-1 / ISO 13849-1 safety category 3, the IEC/EN 61508 SIL2 standard for functional safety and the power drive system standard IEC/EN 61800-5-2.

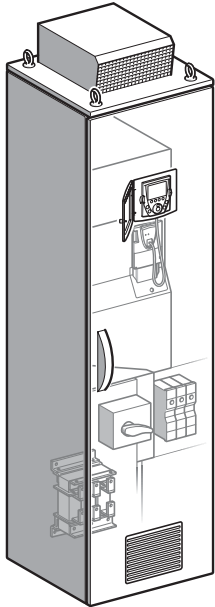
Connecting and disconnecting the motor

Alternatively to the use of the control terminal PWR "Safe Standstill" a safety switch or a motor contactor can be installed to connect and disconnect the motor. Because the inverter recognizes the respective switching state, there is no risk of demolition or fault switch-off.

After connection the motor restarts by means of the function "Catch on the fly".

Inverters in standard enclosures for 400 V networks

The basic equipment contains:



- Frequency inverter ATV61 with integrated EMC filter
- Mains connection on circuit breaker
- Circuit breaker (without door handle)
- DC choke
- LCD operating panel (mounted into the enclosure door)
- Terminals/bars for motor connection
- Protection degree IP54 with separated air flow:
air flow through the plinth of the enclosure and mounted air guidance hood. Cooling of the control part by means of filter fans in the enclosure door.
- Max. inflow coolant temperature 0...40°C
- Enclosure Sarel S6000, color RAL 7032
- Multilingual operating instructions
- Documentation-CD-ROM with parameterization instructions, fieldbus instructions, operating and parameterizing software,...
- Enclosure layout plans consisting of circuit diagram, terminal connection table, list of materials and design drawing

Description

Altivar 61 Plus

ATV61ES5●●●N4

"Simplified version"

General technical data	
Input	
Voltage	400 (380, 415) V $\pm 10\%$ for TT, TN-C, TN-S or IT networks *)
Frequency	50 / 60 Hz $\pm 5\%$ *)
Overvoltage class	Class III according to EN 50178
*) Technical data and remarks for mains voltages are given in chapter "Mains conditions", page 21.	
Output	
Control method	Vector-oriented flux control without feedback, V/f characteristic, energy saving system
Voltage	3 AC 0...100% mains voltage, dynamic voltage stabilization
Overload	20 % for 60 seconds per 10 minutes, 35 % for 2 seconds
Pulse frequency	2.5 kHz, adjustable from 2...8 kHz
Frequency / Base frequency	0.1...500 Hz / 25...500 Hz, adjustable
Short circuit protection	All-pole protected against short circuit and earth fault by means of overcurrent switch-off
Design	Floor-standing enclosure
Cooling	forced
Frequency resolution, digital	0.01 Hz / 50 Hz, frequency stability: $\pm 0.01\%$ / 50 Hz
Speed accuracy	V/f mode: slip frequency VC without feedback 0.3 x slip frequency
Mechanical strength	
Mechanical vibration	According to IEC/EN 60068-2-6 1.5 mm at 3...10 Hz, 0.6 g at 10...200 Hz (3M3 according to IEC/EN 60721-3-3)
Shock	According to IEC/EN 60068-2-27 4 g for 11 ms (3M2 according to IEC/EN 60721-3-3)
Ambient conditions	
Operating temperature	0...+40°C (-10...+40°C with enclosure heating) 3K3 according to IEC/EN 60721-3-3 up to +50°C with derating
Storage / Transport temperature	-25...+70°C
Protection degree	IP54 with separated air flow
Environmental class / Humidity	Class 3K3 in accordance with IEC/EN 60721-3-3 / no condensation, max. 95 % relative humidity
Altitude	Up to 1000 m, beyond power decrease of 1 % per 100 m up to 3000 m
Allowed pollution	Pollution degree: pollution degree 3 according to EN 61800-5-1 Chemical / mechanical classification: 3C2 and 3S2 according to EN 60721-3-3
Protection class	Class 1 according to EN 50178
Standards	
Basic standard	The devices are designed, built and tested on the basis of EN 50178.
EMC immunity	According to EN 61800-3, 1st and 2nd environment (IEC 1000-4-2; IEC 1000-4-3; IEC 1000-4-4; IEC 1000-4-5; IEC 1000-4-6)
EMC emission	In accordance with product standard EN 61800-3, 2nd environment, category C3
Insulation	Galvanic insulation in accordance with EN 50178 PELV (Protective Extra Low Voltage)
Standards	CE

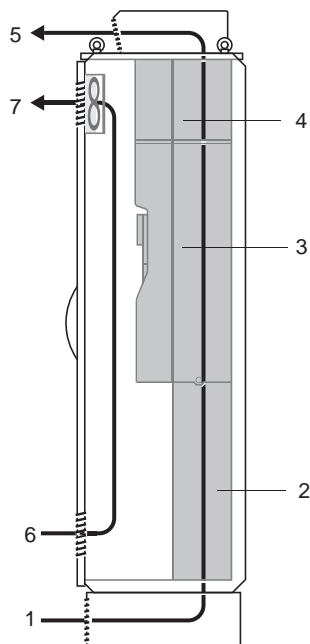


Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

Protection degree

The standard design of the ATV61ES5●●●N4 enclosure units corresponds with protection degree IP54 with separated air flow. This solution contains a clearly specified and tested cooling system which provides highest operating safety.

ATV61ES5 - Enclosure design IP54 with separated air flow



In case of protection degree IP54 with separate air channel the cooling air inlet for the power part takes place through the plinth and the air outlet through the enclosure roof. The control part is cooled by filter fans in the enclosure door.

- 1 Cooling air for power part (via enclosure plinth)
- 2 Air guidance channel
- 3 Frequency inverter ATV61
- 4 DC choke
- 5 Air outlet through metal grid with splash water protection
- 6 Air inlet (with filter mat) for control part
- 7 Air outlet (with filter fan) for control part

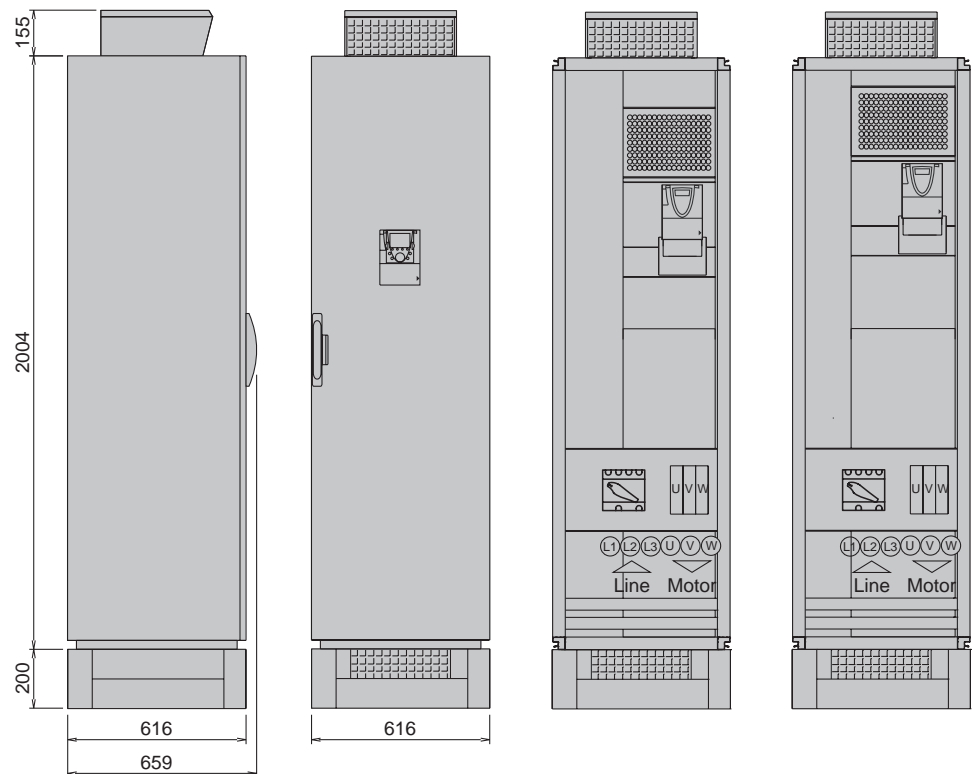
Protection degree: IP54

Air inlet temperature: 0...+40°C

Technical data				
Type		ATV61ES5 D90N4	C11N4	C13N4
Built-in standard device		ATV61HD90N4	ATV61HC11N4	ATV61HC13N4
Nominal data				
Motor rating				
P_N [kW]	$V_N = 400$ V	90	110	132
Continuous output current				
I_N [A]	$V_N = 400$ V	179	215	259
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 400$ V	215	258	311
Input				
Input current				
I_{IN} [A]	$V_N = 400$ V	159	189	227
Continuous apparent power				
S_N [kVA]	$V_N = 400$ V	109	133	157
Braking unit				
P_{CONT}/P_{MAX} [kW]		70/108	70/132	85/160
R_{MIN}/R_{MAX} [Ω]		2.5	2.5	2.1
Characteristics				
Efficiency [%]		≥ 97.0	≥ 97.0	≥ 97.0
Losses [W]	at I_N	2590	3230	3800
Weight net/gross [kg]		260/300	260/300	260/300
Ambient conditions				
Volume of cooling air [m ³ /h]		500	500	700
Sound pressure level [dB(A)]		64	64	64
Mains short circuit current [kA] *)		50	50	50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

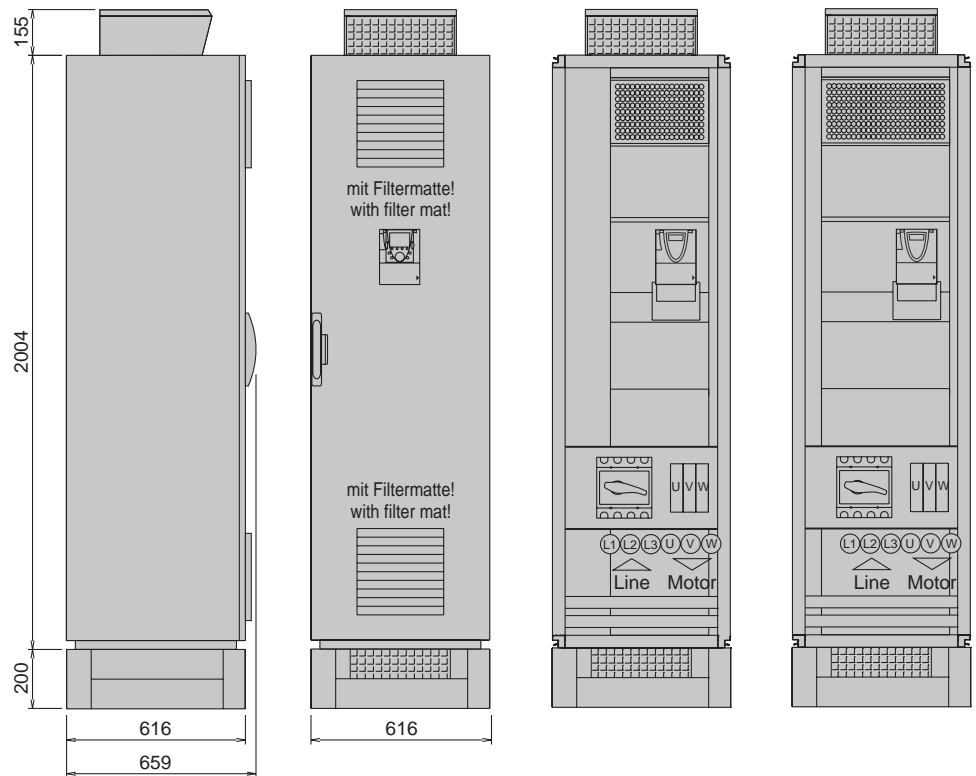
Dimensions: ATV61ES5D90N4, C11N4 ATV61ES5C13N4



Type	ATV61ES5 C16N4	C22N4	
Built-in standard device	ATV61HC16N4	ATV61HC22N4	
Nominal data			
Motor rating			
P_N [kW]	$V_N = 400$ V	160	220
Continuous output current			
I_N [A]	$V_N = 400$ V	314	427
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 400$ V	377	512
Input			
Input current			
I_{IN} [A]	$V_N = 400$ V	271	369
Continuous apparent power			
S_N [kVA]	$V_N = 400$ V	190	261
Braking unit			
P_{CONT}/P_{MAX} [kW]		100/192	120/240
R_{MIN}/R_{MAX} [Ω]		1.75	1.75
Characteristics			
Efficiency [%]		≥ 97.3	≥ 97.3
Losses [W]	at I_N	4300	5830
Weight net/gross [kg]		280/320	290/330
Ambient conditions			
Volume of cooling air [m^3/h]		750	950
Sound pressure level [dB(A)]		72	72
Mains short circuit current [kA] *)		50	50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: ATV61ES5C16N4 ATV61ES5C22N4

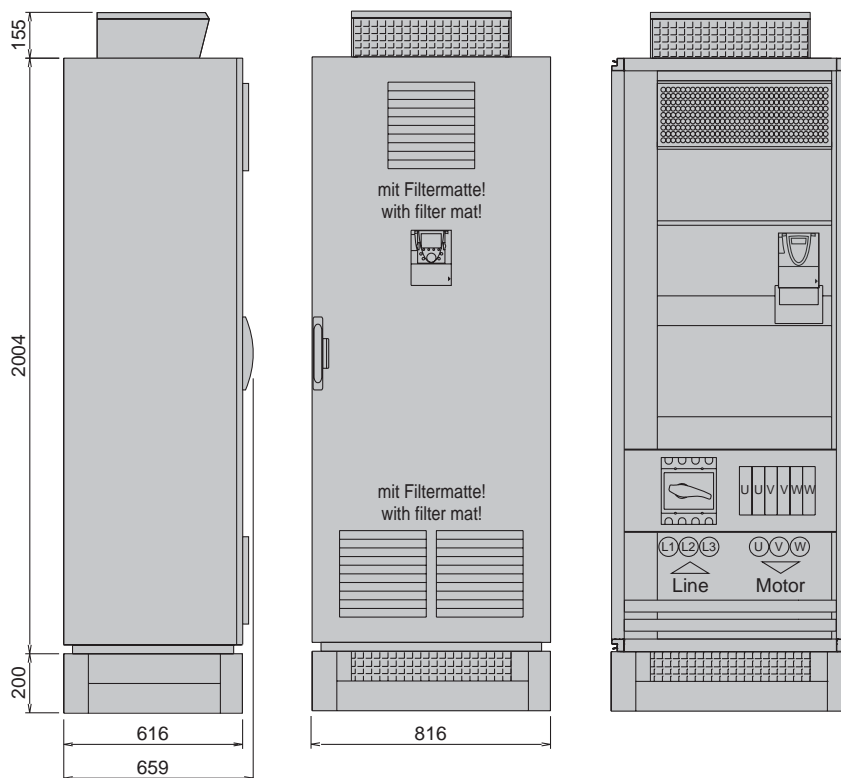


Type	ATV61ES5 C25N4	C31N4	
Built-in standard device	ATV61HC25N4	ATV61HC31N4	
Nominal data			
Motor rating			
P_N [kW]	$V_N = 400$ V	250	315
Continuous output current			
I_N [A]	$V_N = 400$ V	481	616
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 400$ V	577	739
Input			
Input current			
I_{IN} [A]	$V_N = 400$ V	418	527
Continuous apparent power			
S_N [kVA]	$V_N = 400$ V	292	365
Braking unit			
P_{CONT}/P_{MAX} [kW]		200/300	200/375
R_{MIN}/R_{MAX} [Ω]		1.05	1.05
Characteristics			
Efficiency [%]		≥ 97.3	≥ 97.3
Losses [W]	at I_N	6780	8370
Weight net/gross [kg]		395/440	395/440
Ambient conditions			
Volume of cooling air [m^3/h]		1400	1400
Sound pressure level [dB(A)]		72	72
Mains short circuit current [kA] *)		50	50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions:

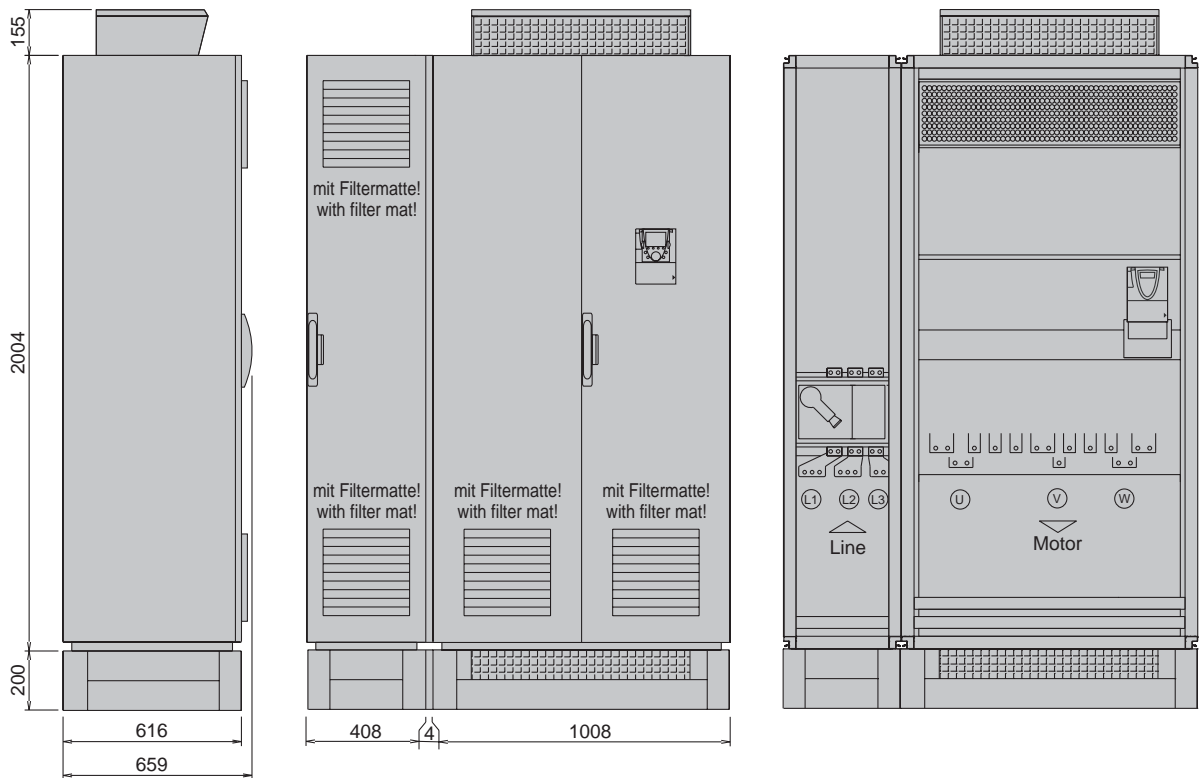
ATV61ES5C25N4, C31N4



Type	ATV61ES5		C50N4
Built-in standard device	C40N4		ATV61HC50N4
Nominal data			
Motor rating			
P_N [kW]	$V_N = 400$ V	400	500
Continuous output current			
I_N [A]	$V_N = 400$ V	759	941
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 400$ V	911	1129
Input			
Input current			
I_{IN} [A]	$V_N = 400$ V	661	835
Continuous apparent power			
S_N [kVA]	$V_N = 400$ V	467	577
Braking unit			
P_{CONT}/P_{MAX} [kW]	400/480		400/600
R_{MIN}/R_{MAX} [Ω]	0.7		0.7
Characteristics			
Efficiency [%]	≥ 97.5		≥ 97.5
Losses [W]	at I_N	10230	12850
Weight net/gross [kg]	640/700		660/720
Ambient conditions			
Volume of cooling air [m ³ /h]	2200		2300
Sound pressure level [dB(A)]	73		73
Mains short circuit current [kA] *)	50		50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

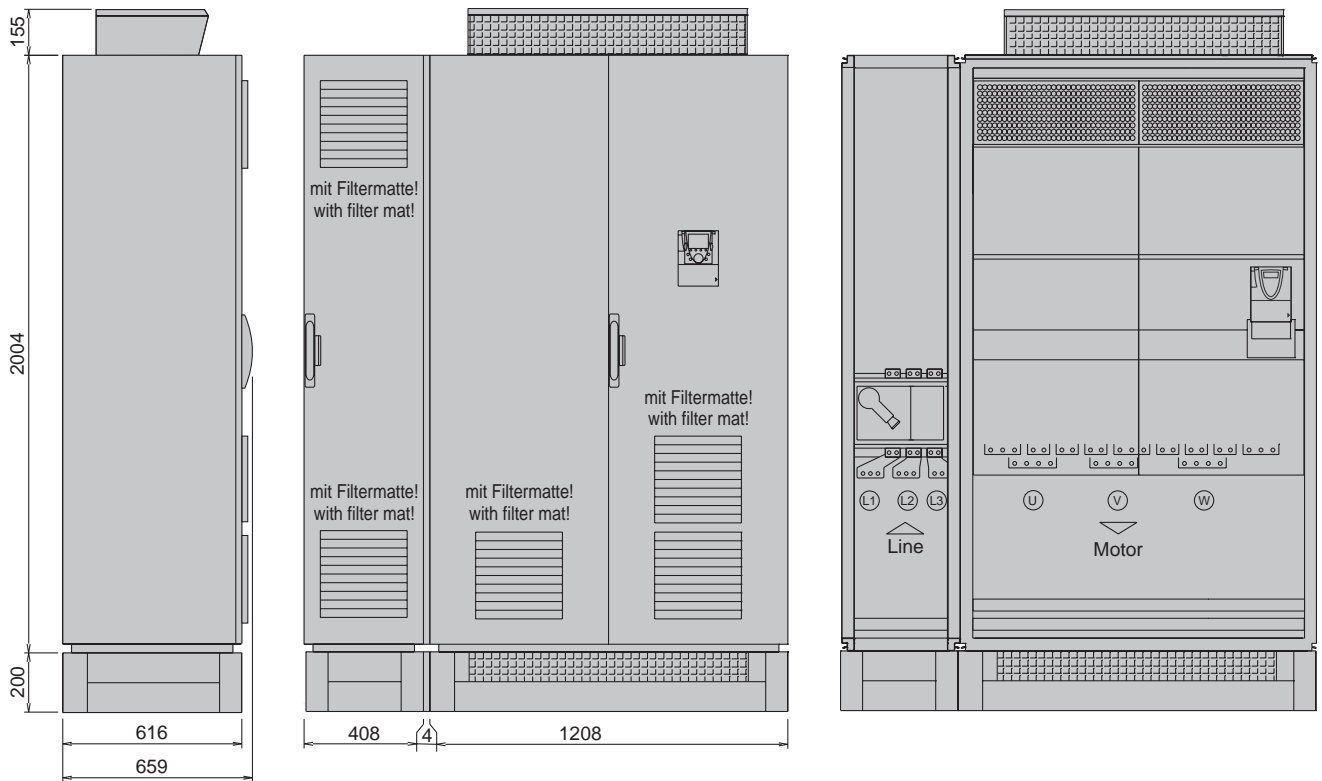
Dimensions: ATV61ES5C40N4, C50N4



Type		ATV61ES5 C63N4
Built-in standard device		ATV61HC63N4
Nominal data		
Motor rating		
P_N [kW]	$V_N = 400$ V	630
Continuous output current		
I_N [A]	$V_N = 400$ V	1188
Maximum current for 60 s per 10 minutes		
I_{MAX} [A]	$V_N = 400$ V	1426
Input		
Input current		
I_{IN} [A]	$V_N = 400$ V	1037
Continuous apparent power		
S_N [kVA]	$V_N = 400$ V	718
Braking unit		
P_{CONT}/P_{MAX} [kW]	400/750	
R_{MIN}/R_{MAX} [Ω]	0.7	
Characteristics		
Efficiency [%]	≥ 97.5	
Losses [W]	at I_N	15950
Weight net/gross [kg]	785/850	
Ambient conditions		
Volume of cooling air [m ³ /h]	3000	
Sound pressure level [dB(A)]	73	
Mains short circuit current [kA] *)	50	

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

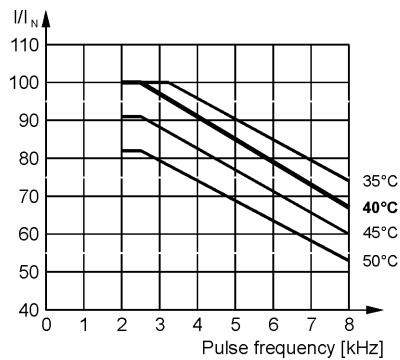
Dimensions: ATV61ES5C63N4



Power decrease

Depending on the chosen pulse frequency and the maximum ambient temperature a power increase is possible or a power reduction is necessary. This can be determined by means of the following diagrams.

ATV 61ES5D90N4 ... ES563N4



Please observe the following guidelines to guarantee trouble-free operation of the drive:

- At higher pulse frequencies the allowed motor cable length is reduced (see chapter "Motor cable lengths").
- Select a motor that is at most one type bigger.



If the heat sink temperature is too high, the pulse frequency is automatically reduced to prevent an overload of the inverter.

Fuses and cable cross sections

The Altivar enclosure designs have input fuses built-in as standard. These fuses are for the case that the electronic protective mechanism of the inverter fails. So they are a secondary protection of the inverter to protect the power cables against overload and to protect the input rectifier against an internal short-circuit.

The below-mentioned diameters for 3-wire cables are recommended values for laying the cable in air at max. 40°C ambient temperature, based on the regulations ÖVN EN 1 and VDE 0100.

The lines in the enclosure are dimensioned according to the specification for single conductors XLPE/EPR copper 90°C.

The motor cables are dimensioned for the maximum continuous current. They apply to 0...100 Hz (up to 300 Hz the cable losses increase about 25 % because of the Skin-effect).



In case of other ambient conditions and different regulations the cable diameters must be adjusted.



If the mains fuses blow the inverter already has a primary defect. Therefore, exchanging the blown fuses and switching the inverter on again is not effective. Consequently, the use of circuit breakers is not advantageous and has additionally the disadvantage of a slower switch-off.



A low cost alternative to screened motor cables is the use of NYCY or NYCWY cables (power cables with concentric protective conductor).



The dimensioning of the pre-fuses, mains cable cross sections and mains cable length has to be done taking into account the available mains short circuit current to ensure a safe switch-off in case of a fault!

If required increase the power of the transformer to reach the necessary short circuit capability.

Cable cross sections

		Mains supply			Motor output			Recommended cable [mm ²]
		Number of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)	Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	
ATV61ES5 (6-pulse)	D90N4	3	250A	1x (3x 120)	2x 185 (M12)	2x 150 (M10)	2x 150 (M10)	1x (3x 95)
	C11N4	3	250A	1x (3x 120)	2x 185 (M12)	2x 150 (M10)	2x 150 (M10)	1x (3x 120)
	C13N4	3	315A	1x (3x 185)	2x 185 (M12)	2x 150 (M10)	2x 150 (M10)	1x (3x 150)
	C16N4	3	400A	2x (3x 120)	2x 150 (M10)	2x 240 (M12)	4x 240 (M12)	2x (3x 95)
	C22N4	3	500A	2x (3x 150)	2x 150 (M10)	2x 240 (M12)	4x 240 (M12)	2x (3x 120)
	C25N4	3	630A	2x (3x 185)	2x 300 (M10) ¹⁾	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C31N4	3	800A	3x (3x 185)	3x 185 (M12)	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
	C40N4	3	1000A	4x (3x 185)	4x 300 (M12)	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
	C50N4	3	1250A	4x (3x 240)	4x 300 (M12)	4x 240 (M12)	4x 240 (M12)	4x (3x 185)
	C63N4	3	1600A	6x (3x 240)	6x 300 (M12) ¹⁾	6x 240 (M12)	6x 240 (M12)	5x (3x 185)

1)Connection only with special cable lugs for switching devices possible



Differing cable cross sections on request.

Motor cable lengths

Because of the permitted mains disturbances, the allowed overvoltages at the motor, the occurring bearing currents and the permitted losses the distance between inverter and motor(s) is limited. The maximum distance heavily depends on the type of motor cable (screened/unscreened) as well as from the used options.

Overvoltages at the motor

Overvoltages at the motor terminals result from reflection in the motor cable. Basically the motors are stressed with measurable higher voltage peaks from a motor cable length of 50 m. Thereby the motor load is nearly independent from the used inverter !

Line supply voltage 400 V	Motor insulation for 1300 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs
---------------------------	--

Line supply voltage 460 V	Motor insulation for 1600 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs
---------------------------	--

In order to use standard motors in this voltage range, the Altivar frequency inverters have a function to inhibit short output voltage pulses. With this function the reflection conditional overvoltages are attenuated. The slew rate as well as the EMC load are not influenced by changing this parameter.

At even longer motor cables the use of a "dv/dt filter" is required. Combined with the cable capacitance the option motor choke affects like a filter and limits the voltage peaks at the motor as well as the slew rate of the output pulses.

When the specified motor cable lengths are observed the motor life time can be significantly extended.

Line supply voltage 400 V	max. 1000 V phase-to-phase peak voltage and dv/dt < 500 V/μs
---------------------------	--

Line supply voltage 460 V	max. 1150 V phase-to-phase peak voltage and dv/dt < 500 V/μs
---------------------------	--



Observing the specified length of motor cables is absolutely necessary to protect the motor !

EMC interferences

The mains rectifier as well as the IGBT inverter cause high-frequent interferences which drain off more and more stronger to the earth potential with increasing motor cable length. As a result the line-conducted interferences to the mains increase. The attenuation of the line reactors is not longer sufficient and the permitted interference limits are exceeded.



Observing the specified length of motor cables is also necessary for compliance with the EMC limits !

Bearing currents

Common mode bearing currents which even cannot be prevented by means of motors equipped with an insulated bearing are significantly reduced by use of the option motor choke.

Especially in case of big motors with middle up to high motor cable lengths the option motor choke is considerable to increase the availability of the motor.

Multiplication factors



The specified lengths of motor cables are recommended limits based on typical motor cables, laying in cable channels, default pulse frequency and maximal output frequency of 100 Hz.

In case of different conditions the recommended cable lengths must be converted by means of the following factors.

If several factors apply, please multiply them.

■ The pulse frequency does not correspond to factory default:

- at 4 kHz multiply all values by 0.7
- at 8 kHz multiply all values by 0.4

■ In case of output frequencies higher than 100 Hz:

- up to 200 Hz multiply all values by 0.8
- up to 300 Hz multiply all values by 0.5

■ Instead of two parallel cables one thicker cable is used: multiply all values by 1.5

■ In case of 6-pole motor cabling (e.g. for star/delta starting circuit): multiply all values by 0.75

■ In case of parallel motors with their centre near the inverter values must be converted in compliance with the number of motors. When an adjusted motor choke is used for each motor, the following values in brackets apply.

- at 2 motors multiply all values by 0.40 (0.80)
- at 3 motors multiply all values by 0.25 (0.60)
- at 4 motors multiply all values by 0.15 (0.40)
- at 5 motors multiply all values by 0.10 (0.25)

■ If the centre of the parallel motors is near the motors, following factors for conversion apply:

- at 2 motors multiply all values by 0.80
- at 3 motors multiply all values by 0.60
- at 4 motors multiply all values by 0.40
- at 5 motors multiply all values by 0.25

Recommended maximum lengths of motor cables in 2nd environment (industrial environment)

C3 (EN 55011 - class A group 2)

no option *)	50 m	screened cable
with motor choke	80 m	screened cable

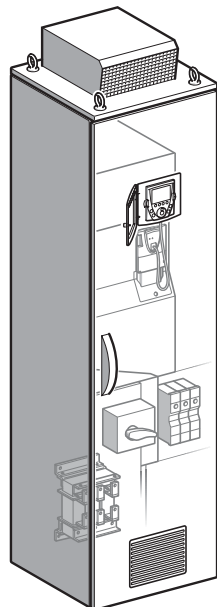
C4 (EMC concept)

no option *)	100 m	screened cable
with motor choke	300 m	screened cable
no option *)	150 m	unscreened cable
with motor choke	300 m	unscreened cable

*) By means of a software function to inhibit short output voltage pulses the overvoltage at the motor terminals is limited to the double DC voltage. Before you can use this function you have to ensure that the motor is suitable!

Inverters in standard enclosures for 400 V networks

The basic equipment contains:



- Frequency inverter ATV61 with integrated EMC filter
- Mains connection on main switch
- Main switch (without door handle)
- Superfast semiconductor fuses for inverter protection
- Line reactor (DC choke for ATV61EXS5●●●N4)
For ATV61EXA●●●N4 the line reactor is available as option.
- Control transformer for 230 V to supply the cooling system as well as optional components (only at ATV61EXA●●●N4)
- LCD operating panel (mounted into the enclosure door)
- Terminals/bars for motor connection
- Protection degree IP23:
air inlet through the enclosure door, air outlet through the enclosure roof.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid in the enclosure door.
- Protection degree IP54:
air inlet through the enclosure door, air outlet through fan on the top.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid with filter in the enclosure door.
- Protection degree IP54 with separated air flow:
air flow through the plinth of the enclosure and mounted air guidance hood. Cooling of the control part by means of filter fans in the enclosure door.
- Max. inflow coolant temperature 0...40°C
- Enclosure Sarel S6000, color RAL 7032
- Multilingual operating instructions
- Documentation-CD-ROM with parameterization instructions, fieldbus instructions, operating and parameterizing software,...
- Enclosure layout plans consisting of circuit diagram, terminal connection table, list of materials and design drawing

Description

Altivar 61 Plus

ATV61EX●●●●●N4

Line supply voltage 400 V

General technical data	
Input	
Voltage	400 (380, 415) V $\pm 10\%$ for TT, TN-C, TN-S or IT networks *)
Frequency	50 / 60 Hz $\pm 5\%$ *)
Overvoltage class	Class III according to EN 50178
*) Technical data and remarks for mains voltages are given in chapter "Mains conditions", page 21.	
Output	
Control method	Vector-oriented flux control without feedback, V/f characteristic, energy saving system
Voltage	3 AC 0...100% mains voltage, dynamic voltage stabilization
Overload	20 % for 60 seconds per 10 minutes, 35 % for 2 seconds
Pulse frequency	2.5 kHz, adjustable from 2...8 kHz (at ATV61EXA●●●●●N4 max. 4.9 kHz)
Frequency / Base frequency	0.1...500 Hz / 25...500 Hz, adjustable
Short circuit protection	All-pole protected against short circuit and earth fault by means of overcurrent switch-off
Design	Floor-standing enclosure
Cooling	forced
Frequency resolution, digital	0.01 Hz / 50 Hz, frequency stability: $\pm 0.01\%$ / 50 Hz
Speed accuracy	V/f mode: slip frequency VC without feedback 0.3 x slip frequency
Mechanical strength	
Mechanical vibration	According to IEC/EN 60068-2-6 1.5 mm at 3...10 Hz, 0.6 g at 10...200 Hz (3M3 according to IEC/EN 60721-3-3)
Shock	According to IEC/EN 60068-2-27 4 g for 11 ms (3M2 according to IEC/EN 60721-3-3)
Ambient conditions	
Operating temperature	0...+40°C (-10...+40°C with enclosure heating) 3K3 according to IEC/EN 60721-3-3 up to +50°C with derating
Storage / Transport temperature	-25...+70°C
Protection degree	selective: ATV61EXC2●●●●●N4 ... IP23 ATV61EXC5●●●●●N4 ... IP54 with air intake through filter mats ATV61EXS5●●●●●N4 ... IP54 with separated air flow ATV61EXA2●●●●●N4 ... IP23 with internal cooling circuit ATV61EXA5●●●●●N4 ... IP54 with internal cooling circuit
Environmental class / Humidity	Class 3K3 in accordance with IEC/EN 60721-3-3 / no condensation, max. 95 % relative humidity
Altitude	Up to 1000 m, beyond power decrease of 1 % per 100 m up to 3000 m
Allowed pollution	Pollution degree: for IP23 design: pollution degree 2 according to EN 61800-5-1 for IP54 design: pollution degree 3 according to EN 61800-5-1 Chemical / mechanical classification: 3C2 and 3S2 according to EN 60721-3-3
Protection class	Class 1 according to EN 50178
Standards	
Basic standard	The devices are designed, built and tested on the basis of EN 50178.
EMC immunity	According to EN 61800-3, 1st and 2nd environment (IEC 1000-4-2; IEC 1000-4-3; IEC 1000-4-4; IEC 1000-4-5; IEC 1000-4-6)
EMC emission	In accordance with product standard EN 61800-3, 2nd environment, category C3
Insulation	Galvanic insulation in accordance with EN 50178 PELV (Protective Extra Low Voltage)
Standards	CE



Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

Protection degree ATV61EXC● and ATV61EXS5

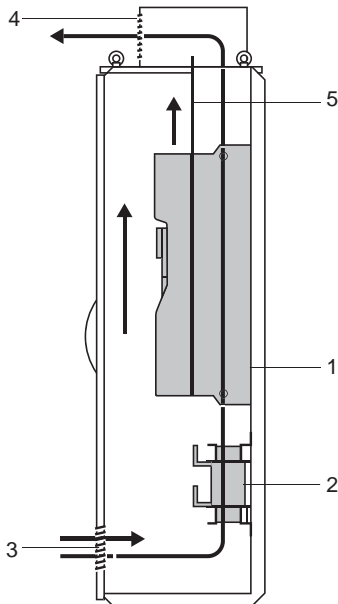
In order to adapt the utmost robust Altivar product line with enclosure design optimal to the individual requests of the system, these enclosure units are available in three different designs. Each solution contains a clearly specified and tested cooling system which provides highest operating safety.

The standard design of the ATV61 enclosure units complies with protection degree IP23. If a higher protection degree is desired or required, there are two IP54 solutions available.

- IP54 with filter mats
- IP54 with separated air flow

Overview of standardised protection degrees

ATV61EXC2 - Standard enclosure design IP23



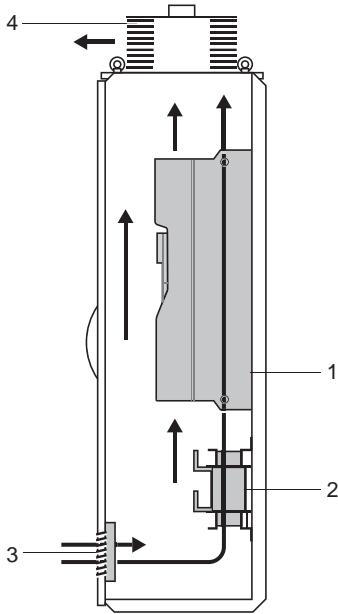
In this case the input of the cooling air takes place by the enclosure door and the output through the top of the enclosure. The air flow must not be constrained by means of fixtures or filter mats.

- 1 Frequency inverter ATV61
- 2 Line reactor
- 3 Air inlet grid (without filter mat) for control part and power part
- 4 Metal cover with splash water protection
- 5 Guided air flow to avoid internal air short-cuts

Protection degree: IP23

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV61EXC5 - Enclosure design IP54



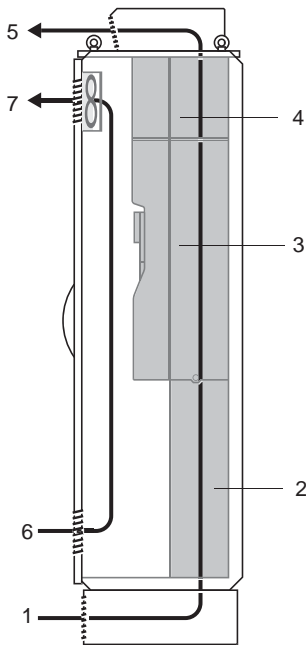
At protection degree IP54 with filter mats the input of the cooling air takes place through the filter mats in the enclosure door and the output through the fan at the top of the enclosure.

- 1 Frequency inverter ATV61
- 2 Line reactor
- 3 Air inlet grid (with filter mat)
- 4 Fan (with filter mat)

Protection degree: IP54

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV61EXS5 - Enclosure design IP54 with separated air flow



In case of protection degree IP54 with separate air channel the cooling air inlet for the power part takes place through the plinth and the air outlet through the enclosure roof. The control part is cooled by filter fans in the enclosure door or by an optional air condition.

- 1 Cooling air for power part (via enclosure plinth)
- 2 Air guidance channel
- 3 Frequency inverter ATV61
- 4 DC choke
(at ATV61EXS5●●●N and ATV61EXS5●●●Y instead of the DC choke a line reactor is delivered in a separate supply field)
- 5 Air outlet through metal grid with splash water protection
- 6 Air inlet (with filter mat) for control part
- 7 Air outlet (with filter fan) for control part

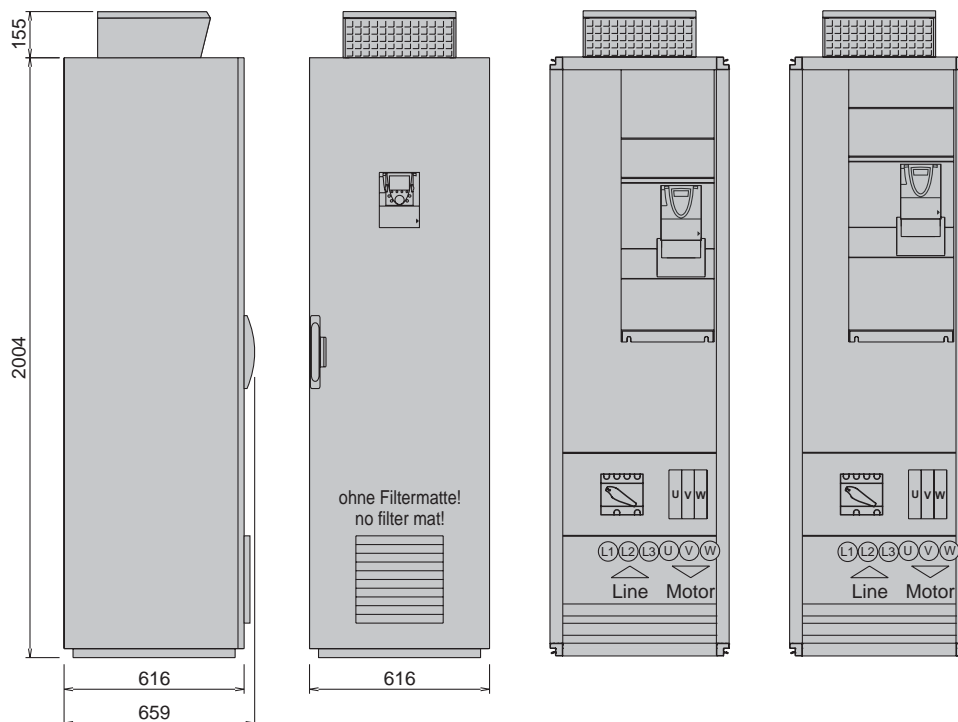
Protection degree: IP54

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

Technical data ATV61EXC● and ATV61EXS5				
Type		ATV61EX●● D90N4	C11N4	C13N4
Built-in standard device		ATV61HD90N4	ATV61HC11N4	ATV61HC13N4
Nominal data				
Motor rating				
P_N [kW]	$V_N = 400$ V	90	110	132
Continuous output current				
I_N [A]	$V_N = 400$ V	179	215	259
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 400$ V	215	258	311
Input				
Input current				
I_{IN} [A]	$V_N = 400$ V	159	189	227
Continuous apparent power				
S_N [kVA]	$V_N = 400$ V	109	133	157
Braking unit				
P_{CONT}/P_{MAX} [kW]		70/108	70/132	85/160
R_{MIN}/R_{MAX} [Ω]		2.5	2.5	2.1
Characteristics				
Efficiency [%]		≥ 97.0	≥ 97.0	≥ 97.0
Losses [W]	at I_N	2590	3230	3800
Weight net/gross [kg]				
ATV61EXC2●●●N4		275/315	275/315	295/335
ATV61EXC5●●●N4		285/325	285/325	305/345
ATV61EXS5●●●N4		270/310	270/310	295/335
Ambient conditions				
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	400 / 400 / 500	400 / 400 / 500	600 / 600 / 700
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	64 / 65 / 64	64 / 65 / 64	64 / 65 / 64
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 50	100 / 100 / 50	100 / 100 / 50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version ATV61EXC2D90N4, C11N4 ATV61EXC2C13N4



Altivar 61 Plus

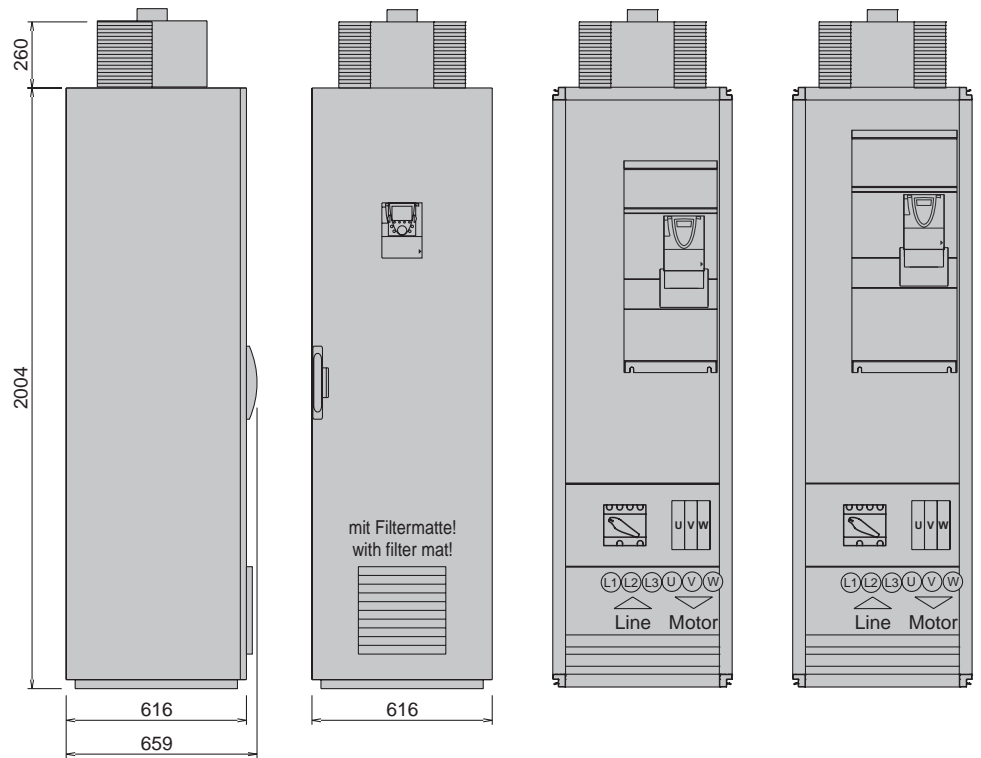
ATV61EX●●●●●N4

Line supply voltage 400 V

Dimensions: IP54CV Compact version

ATV61EXC5D90N4, C11N4

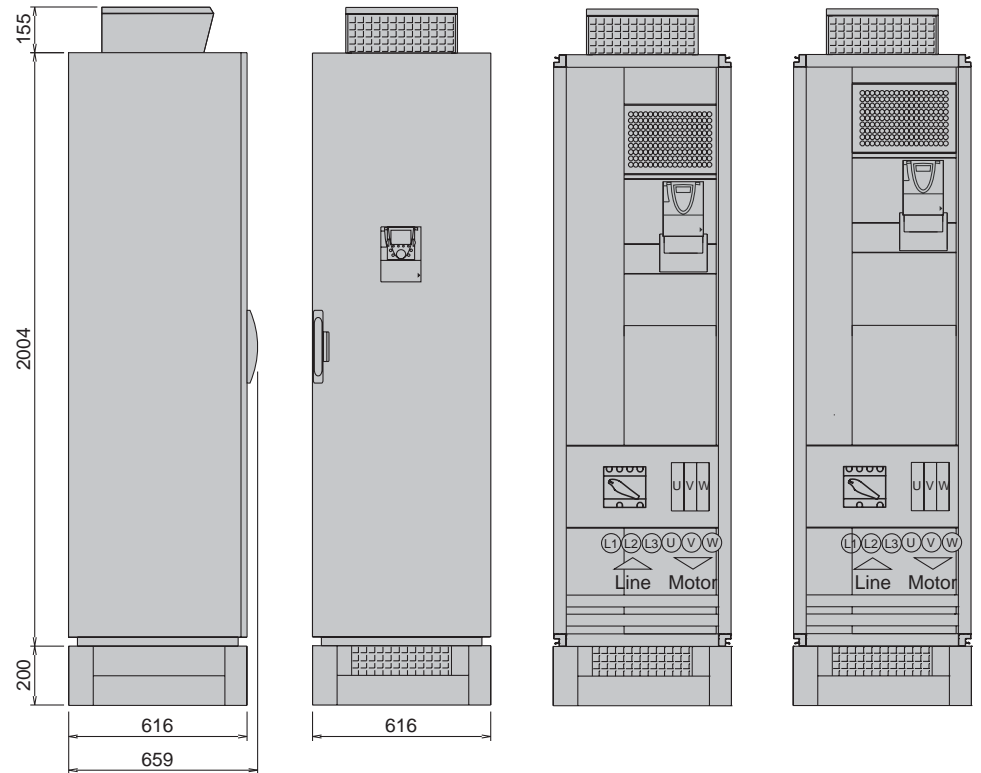
ATV61EXC5C13N4



Dimensions: IP54SA with separated air flow

ATV61EXS5D90N4, C11N4

ATV61EXS5C13N4

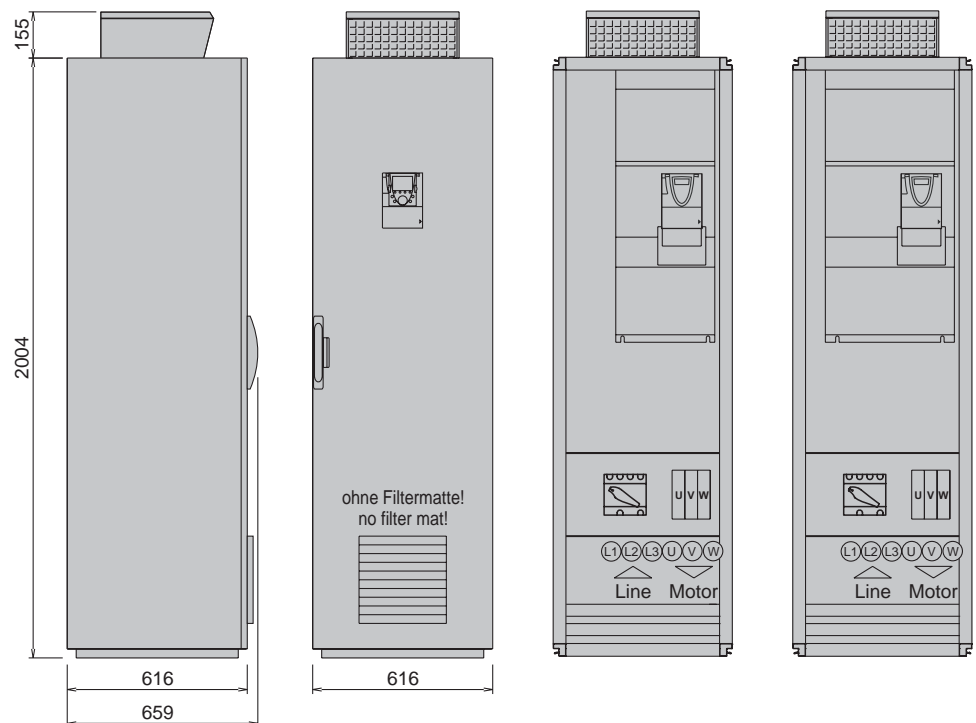


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type		ATV61EX●● C16N4	C22N4
Built-in standard device		ATV61HC16N4	ATV61HC22N4
Nominal data			
Motor rating			
P_N [kW]	$V_N = 400\text{ V}$	160	220
Continuous output current			
I_N [A]	$V_N = 400\text{ V}$	314	427
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 400\text{ V}$	377	512
Input			
Input current			
I_{IN} [A]	$V_N = 400\text{ V}$	271	369
Continuous apparent power			
S_N [kVA]	$V_N = 400\text{ V}$	190	261
Braking unit			
P_{CONT}/P_{MAX} [kW]		100/192	120/240
R_{MIN}/R_{MAX} [Ω]		1.75	1.75
Characteristics			
Efficiency [%]		≥ 97.3	≥ 97.3
Losses [W]	at I_N	4300	5830
Weight net/gross [kg]			
ATV61EXC2●●●N4		310/350	340/380
ATV61EXC5●●●N4		320/360	345/385
ATV61EXS5●●●N4		305/345	355/395
Ambient conditions			
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	600 / 600 / 750	800 / 800 / 950
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	64 / 65 / 72	64 / 65 / 72
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 50	100 / 100 / 50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version ATV61EXC2C16N4 ATV61EXC2C22N4



Altivar 61 Plus

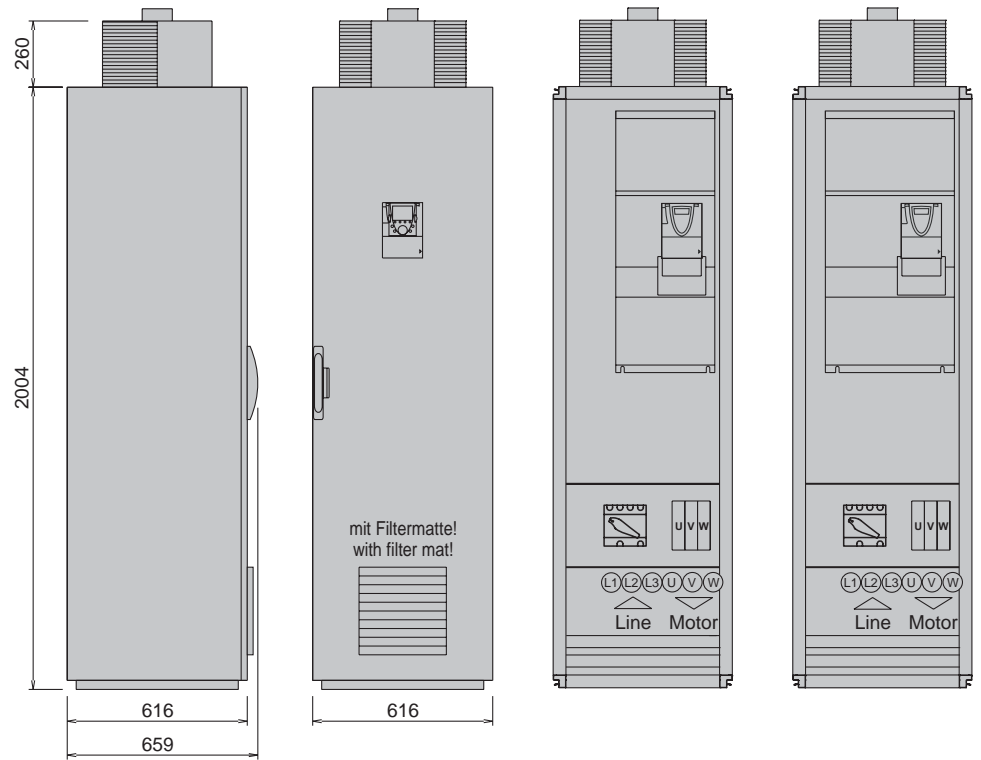
ATV61EX●●●●●N4

Line supply voltage 400 V

Dimensions: IP54CV Compact version

ATV61EXC5C16N4

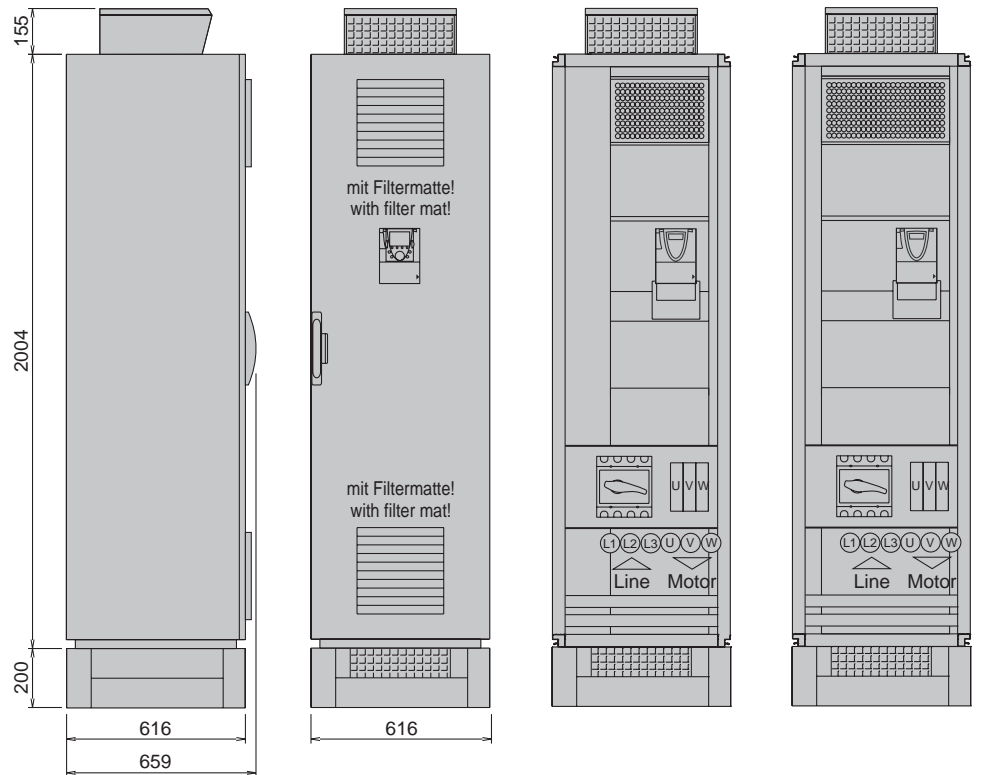
ATV61EXC5C22N4



Dimensions: IP54SA with separated air flow

ATV61EXS5C16N4

ATV61EXS5C22N4



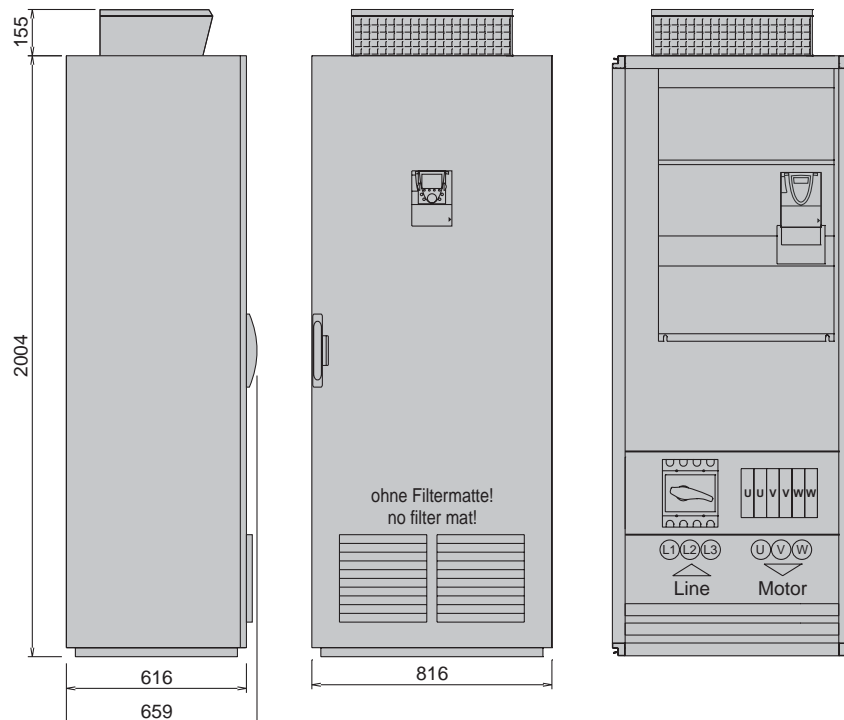
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type		ATV61EX●●	C31N4
Built-in standard device		ATV61HC25N4	ATV61HC31N4
Nominal data			
Motor rating			
P_N [kW]	$V_N = 400$ V	250	315
Continuous output current			
I_N [A]	$V_N = 400$ V	481	616
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 400$ V	577	739
Input			
Input current			
I_{IN} [A]	$V_N = 400$ V	418	527
Continuous apparent power			
S_N [kVA]	$V_N = 400$ V	292	365
Braking unit			
P_{CONT}/P_{MAX} [kW]		200/300	200/375
R_{MIN}/R_{MAX} [Ω]		1.05	1.05
Characteristics			
Efficiency [%]		≥ 97.3	≥ 97.3
Losses [W]	at I_N	6780	8370
Weight net/gross [kg]			
ATV61EXC2●●●N4		440/485	440/485
ATV61EXC5●●●N4		440/485	440/485
ATV61EXS5●●●N4		435/480	435/480
Ambient conditions			
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	1200 / 1200 / 1400	1200 / 1200 / 1400
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	66 / 68 / 72	66 / 68 / 72
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 50	100 / 100 / 50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version

ATV61EXC2C25N4, C31N4



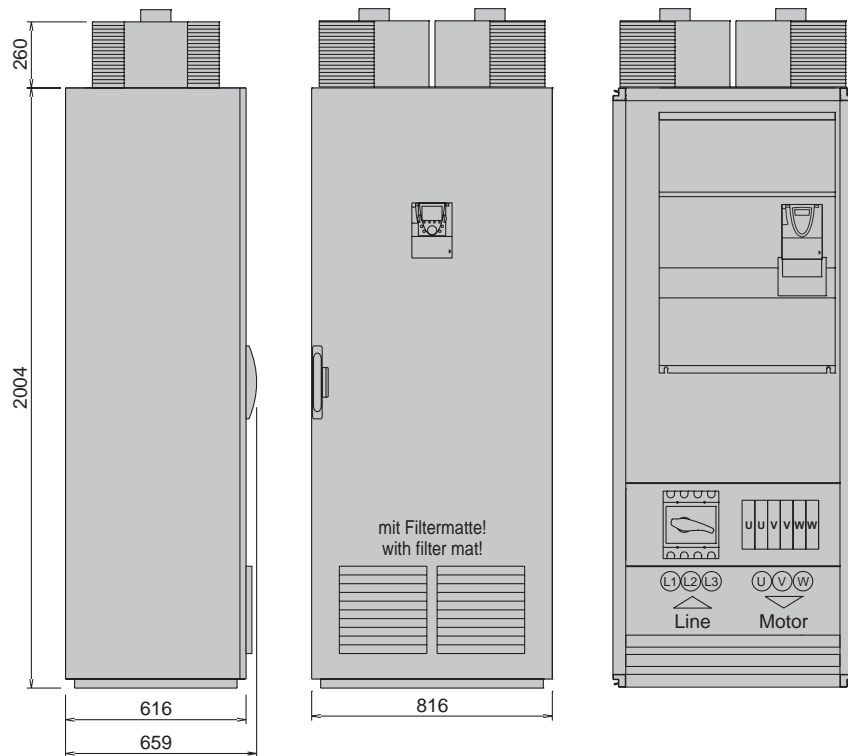
Altivar 61 Plus

ATV61EX●●●●●N4

Line supply voltage 400 V

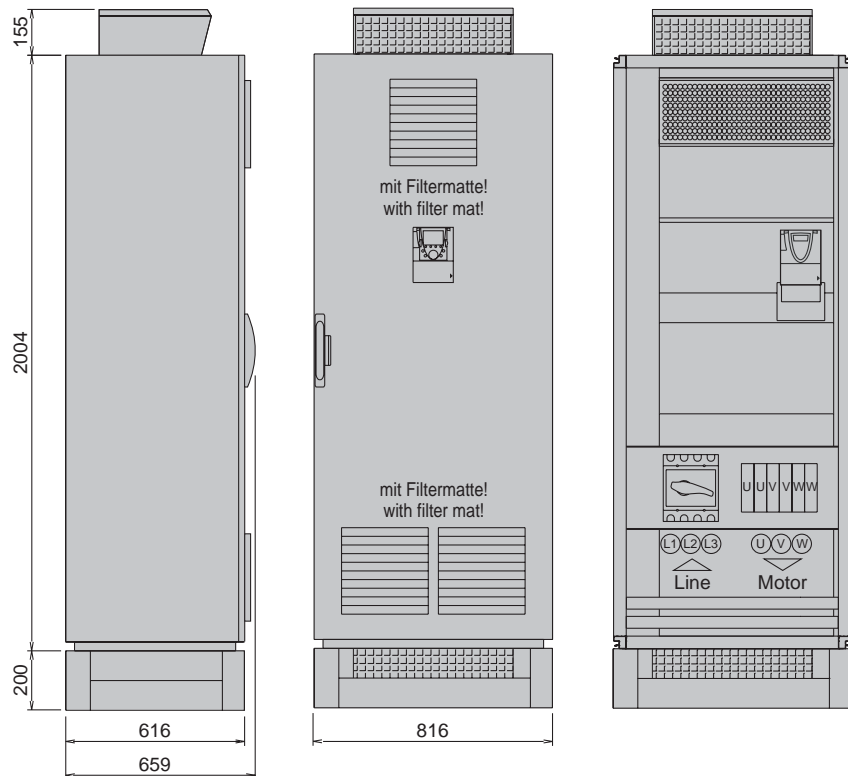
Dimensions: IP54CV Compact version

ATV61EXC5C25N4, C31N4



Dimensions: IP54SA with separated air flow

ATV61EXS5C25N4, C31N4



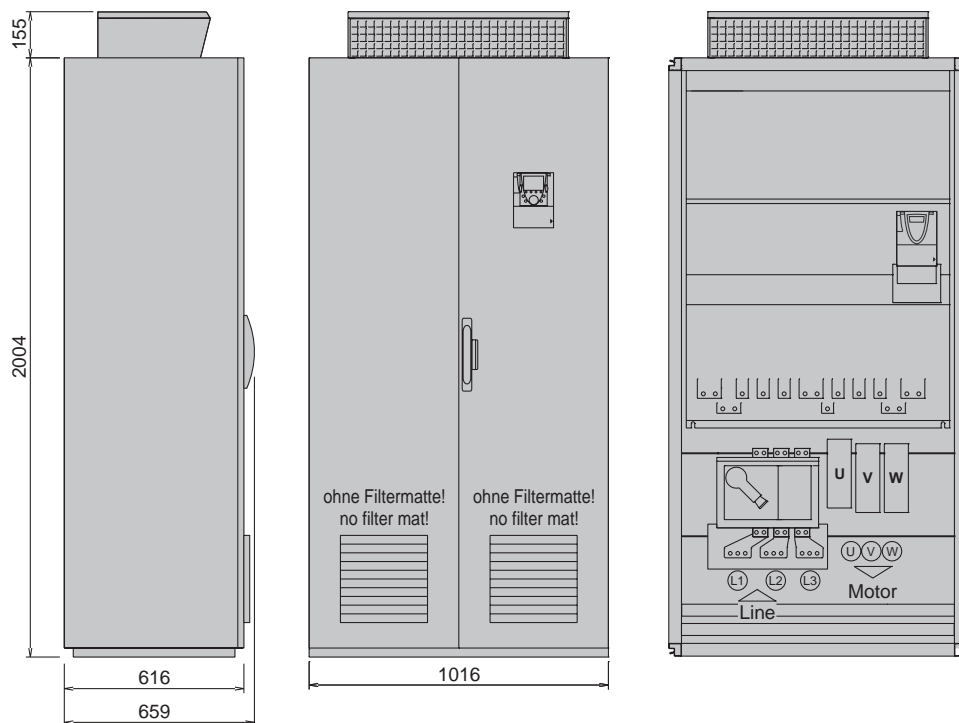
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV61EX●● C40N4		C50N4
Built-in standard device	ATV61HC40N4		ATV61HC50N4
Nominal data			
Motor rating			
P_N [kW]	$V_N = 400$ V	400	500
Continuous output current			
I_N [A]	$V_N = 400$ V	759	941
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 400$ V	911	1129
Input			
Input current			
I_{IN} [A]	$V_N = 400$ V	661	835
Continuous apparent power			
S_N [kVA]	$V_N = 400$ V	467	577
Braking unit			
P_{CONT}/P_{MAX} [kW]	400/480		400/600
R_{MIN}/R_{MAX} [Ω]	0.7		0.7
Characteristics			
Efficiency [%]	≥ 97.5		≥ 97.5
Losses [W]	at I_N	10230	12850
Weight net/gross [kg]			
ATV61EXC2●●●N4	590/640		630/680
ATV61EXC5●●●N4	610/660		650/700
ATV61EXS5●●●N4	685/745		705/765
Ambient conditions			
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	1800 / 1800 / 2200	1800 / 1800 / 2300
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	66 / 78 / 73	66 / 78 / 73
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 50	100 / 100 / 50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version

ATV61EXC2C40N4, C50N4



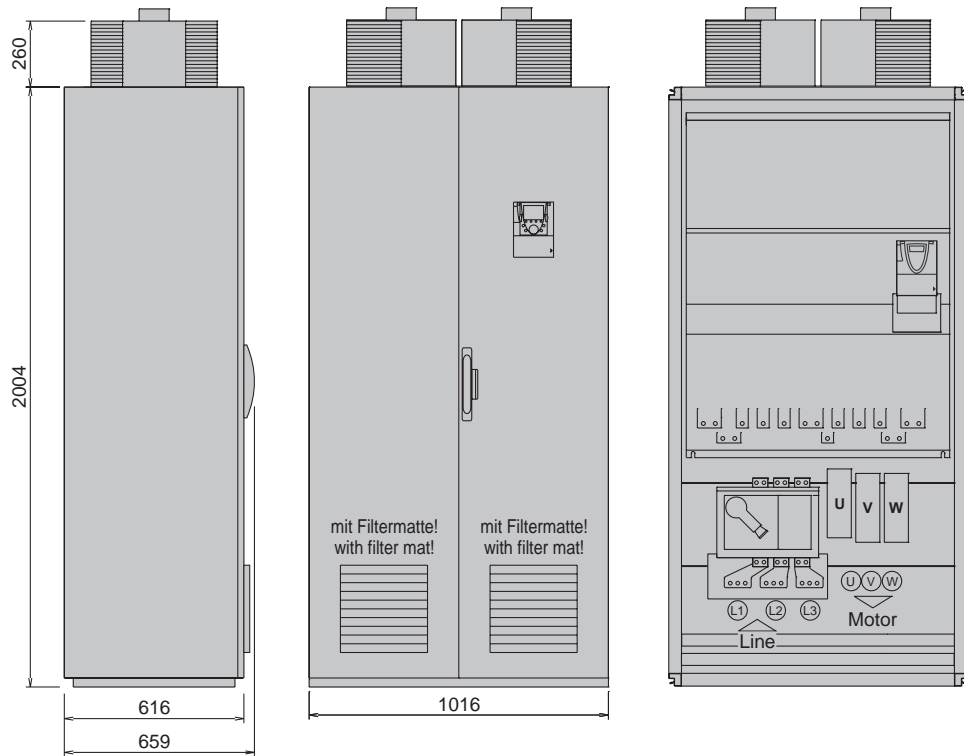
Altivar 61 Plus

ATV61EX●●●●●N4

Line supply voltage 400 V

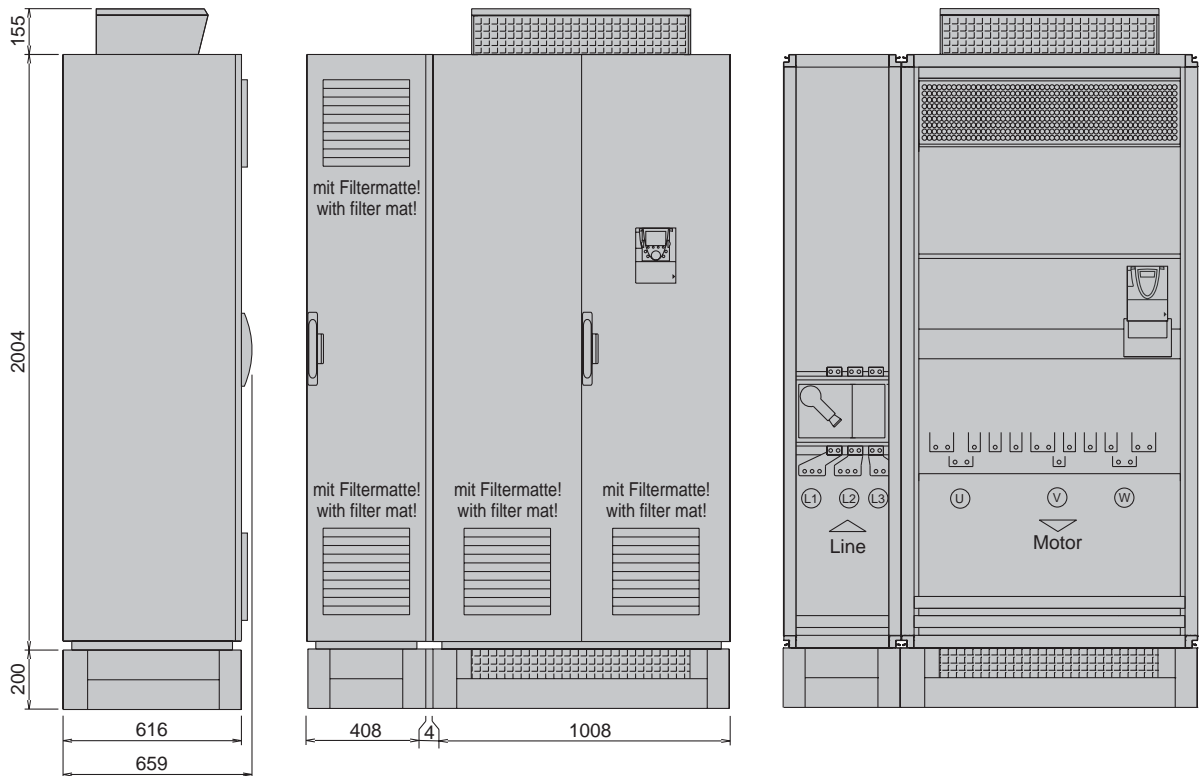
Dimensions: IP54CV Compact version

ATV61EXC5C40N4, C50N4



Dimensions: IP54SA with separated air flow

ATV61EXS5C40N4, C50N4



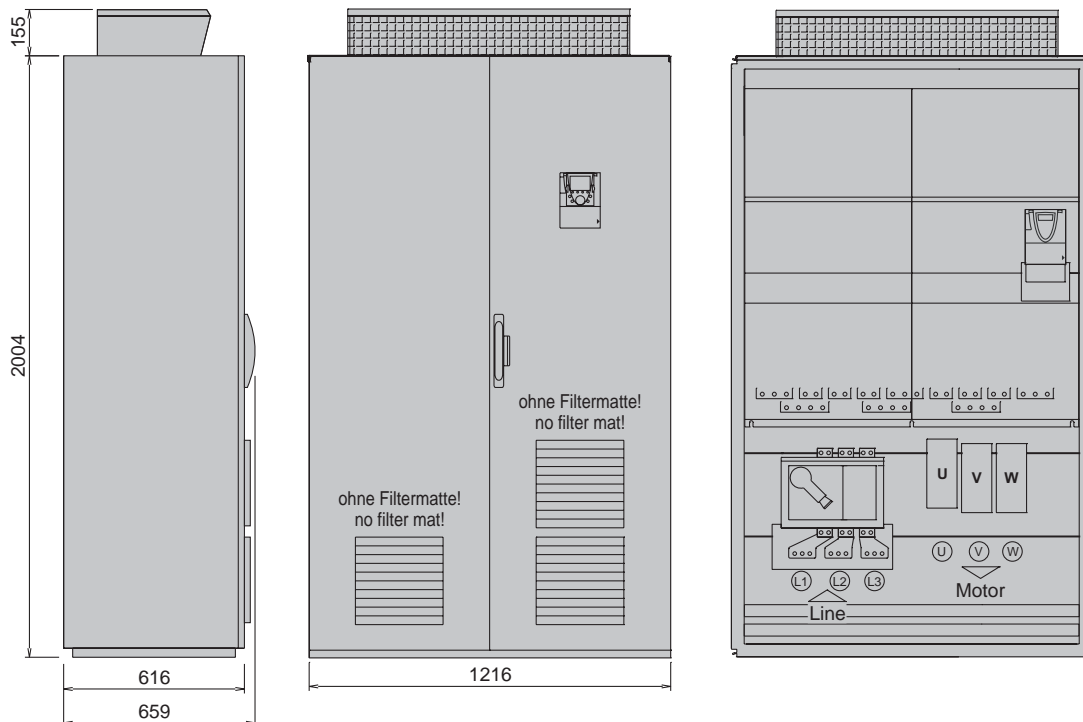
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type		ATV61EX●● C63N4
Built-in standard device		ATV61HC63N4
Nominal data		
Motor rating		
P_N [kW]	$V_N = 400$ V	630
Continuous output current		
I_N [A]	$V_N = 400$ V	1188
Maximum current for 60 s per 10 minutes		
I_{MAX} [A]	$V_N = 400$ V	1426
Input		
Input current		
I_{IN} [A]	$V_N = 400$ V	1037
Continuous apparent power		
S_N [kVA]	$V_N = 400$ V	718
Braking unit		
P_{CONT}/P_{MAX} [kW]		400/750
R_{MIN}/R_{MAX} [Ω]		0.7
Characteristics		
Efficiency [%]		≥ 97.5
Losses [W]	at I_N	15950
Weight net/gross [kg]		
ATV61EXC2●●●N4		750/805
ATV61EXC5●●●N4		780/835
ATV61EXS5●●●N4		835/900
Ambient conditions		
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	2400 / 2400 / 3000
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	69 / 79 / 73
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 50

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version

ATV61EXG2C63N4



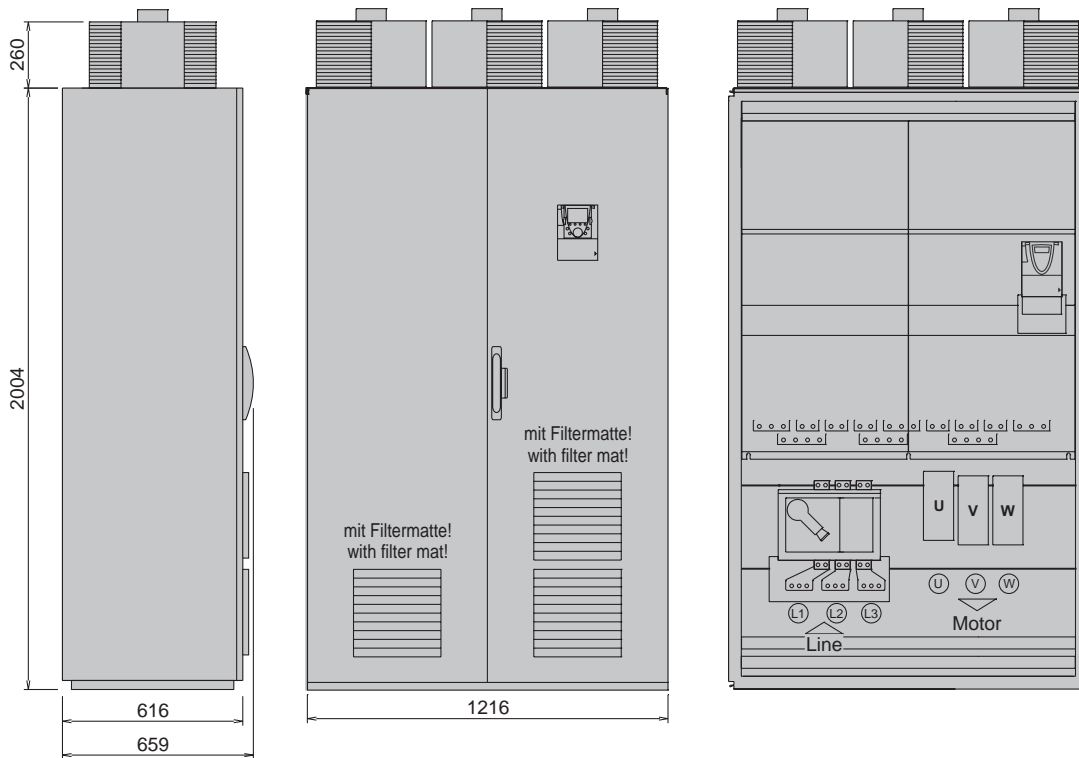
Altivar 61 Plus

ATV61EX●●●●●N4

Line supply voltage 400 V

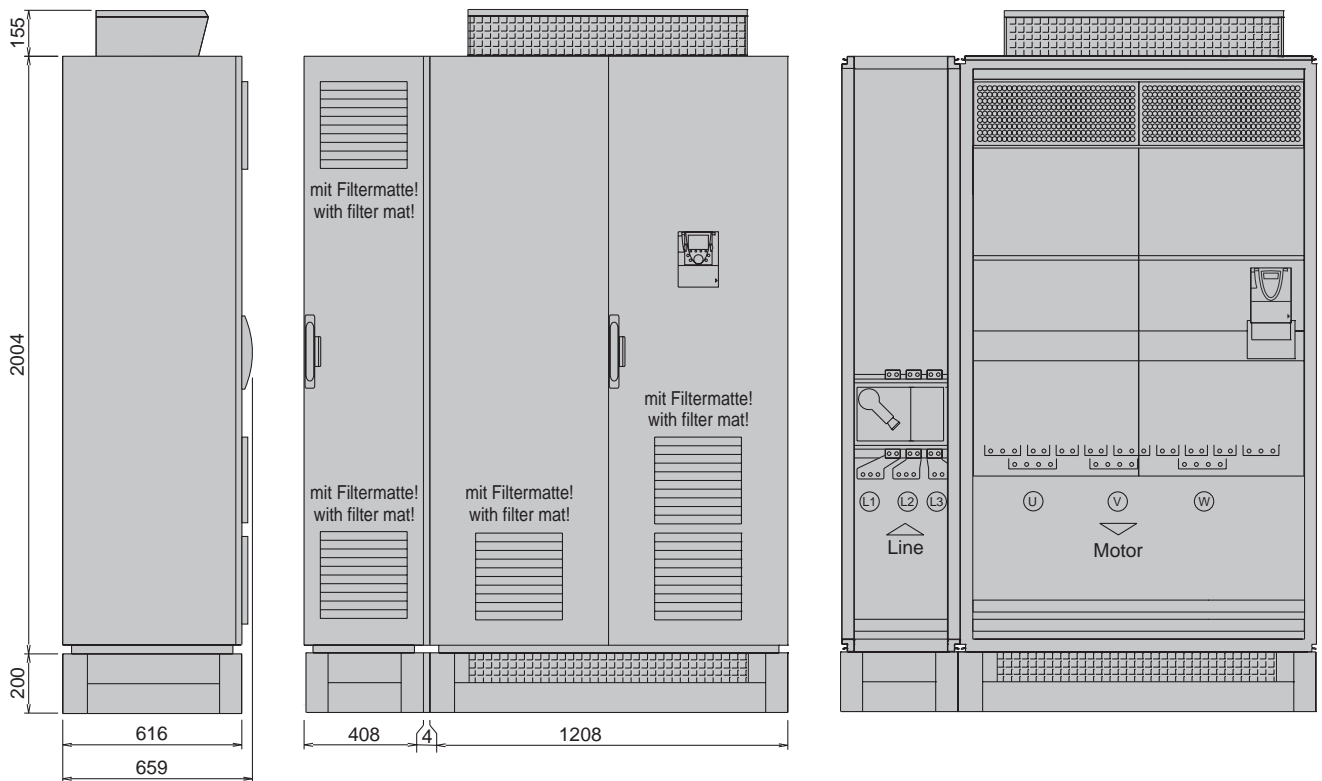
Dimensions: IP54CV Compact version

ATV61EXC5C63N4



Dimensions: IP54SA with separated air flow

ATV61EXS5C63N4



The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Altivar 61 Plus

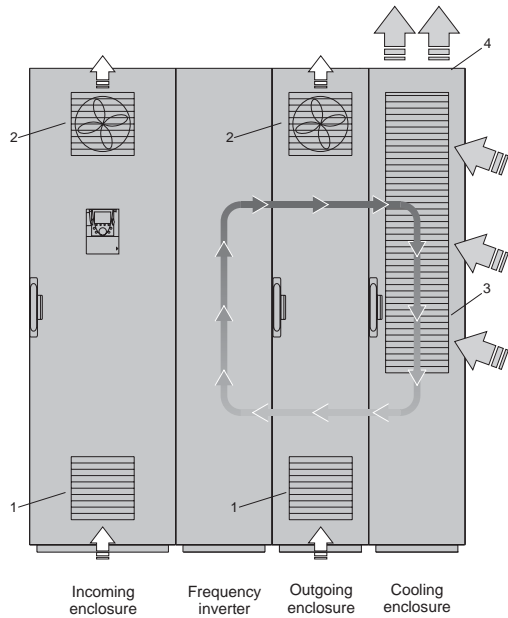
ATV61EX●●●●●N4

Line supply voltage 400 V

Protection degree ATV61EXA●

Overview of available protection degrees

ATV61EXA2 - Enclosure design IP23 with internal cooling circuit



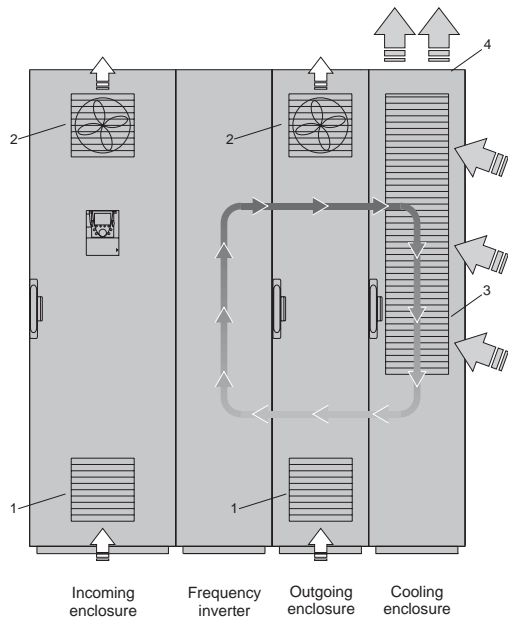
In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by fans in the enclosure door.

- 1 Air inlet grid
- 2 Air outlet with fans
- 3 Air inlet grid with fans for power part
- 4 Air outlet grid for power part

Protection degree: IP23

Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

ATV61EXA5 - Enclosure design IP54 with internal cooling circuit



In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by filter fans in the enclosure door.

- 1 Air inlet grid with filter mats
- 2 Air outlet with filter fans
- 3 Air inlet grid with fans for power part
- 4 Air outlet grid for power part

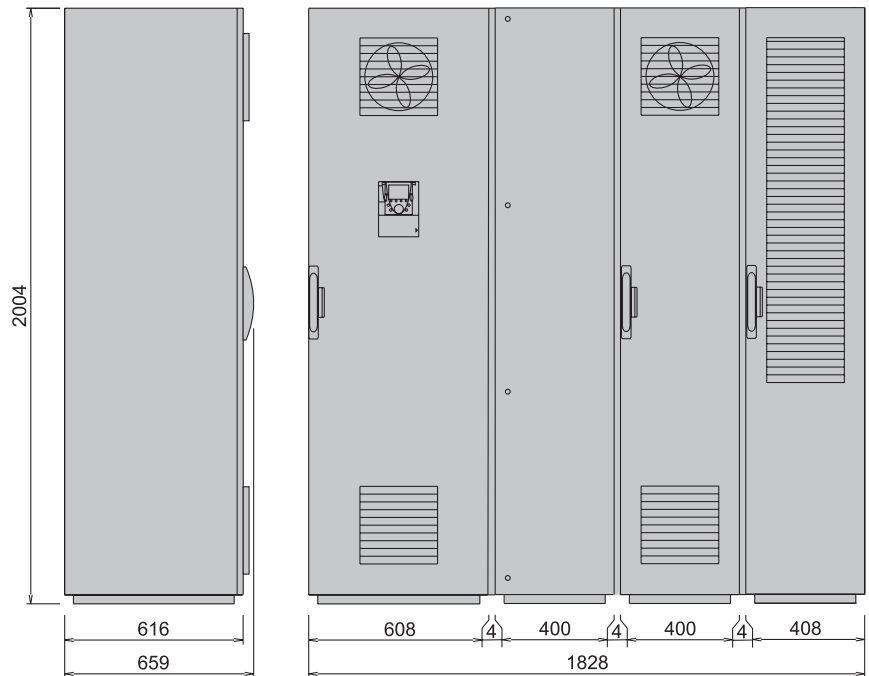
Protection degree: IP54

Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

Technical data ATV61EXA●			
Type		ATV61EXA● C63N4	C71N4
Internal inverter unit		ATV61EC63N4E1	ATV61EC71N4E1
Nominal data			
Motor rating			
P_N [kW]	$V_N = 400$ V	630	710
Continuous output current			
I_N [A]	$V_N = 400$ V	1100	1230
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 400$ V	1320	1476
Input			
Input current			
I_{IN} [A]	$V_N = 400$ V	1084	1225
Continuous apparent power			
S_N [kVA]	$V_N = 400$ V	758	849
Characteristics			
Efficiency [%]		> 98.0	> 98.0
Losses [kW]	at I_N	14.3	16.1
Weight net/gross [kg]		900/950	900/950
Ambient conditions			
Volume of cooling air [m ³ /h]		5500	5500
Sound pressure level [dB(A)]		77	77
Mains short circuit current [kA] *)		100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions: ATV61EXA●C63N4, C71N4



The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV61EXA● C90N4	M11N4	M13N4	M14N4	
Internal inverter unit	ATV61EC90N4E1	ATV61EM11N4E1	ATV61EM13N4E1	ATV61EM14N4E1	
Nominal data					
Motor rating					
P_N [kW]	$V_N = 400$ V	900	1100	1300	1400
Continuous output current					
I_N [A]	$V_N = 400$ V	1580	1860	2200	2430
Maximum current for 60 s per 10 minutes					
I_{MAX} [A]	$V_N = 400$ V	1896	2232	2640	2916
Input					
Input current					
I_{IN} [A]	$V_N = 400$ V	1512	1872	2181	2344
Continuous apparent power					
S_N [kVA]	$V_N = 400$ V	1048	1297	1511	1624
Characteristics					
Efficiency [%]		> 98.0	> 98.0	> 98.0	> 98.0
Losses [kW]	at I_N	19.8	24.0	29.0	32.4
Weight net/gross [kg]		1850/1925	1850/1925	1850/1925	1850/1925
Ambient conditions					
Volume of cooling air [m ³ /h]		11000	11000	11000	11000
Sound pressure level [dB(A)]		79	79	79	79
Mains short circuit curr. [kA *)		100	100	100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions: ATV61EXA●C90N4, M11N4, M13N4, M14N4

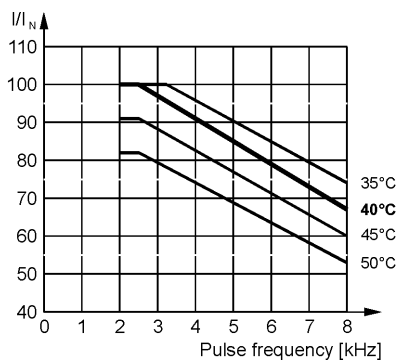


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

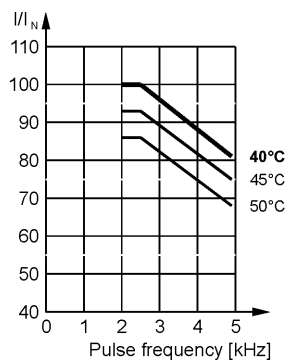
Power decrease

Depending on the chosen pulse frequency and the maximum ambient temperature a power increase is possible or a power reduction is necessary. This can be determined by means of the following diagrams.

ATV 61EX●●D90N4 ... EX●●63N4



ATV 61EXA●C63N4 ... EXA●M14N4



Please observe the following guidelines to guarantee trouble-free operation of the drive:

- At higher pulse frequencies the allowed motor cable length is reduced (see chapter "Motor cable lengths").
- Select a motor that is at most one type bigger.



If the heat sink temperature is too high, the pulse frequency is automatically reduced to prevent an overload of the inverter.

Fuses and cable cross sections

The Altivar enclosure designs have input fuses built-in as standard. These fuses are for the case that the electronic protective mechanism of the inverter fails. So they are a secondary protection of the inverter to protect the power cables against overload and to protect the input rectifier against an internal short-circuit.

The below-mentioned diameters for 3-wire cables are recommended values for laying the cable in air at max. 40°C ambient temperature, based on the regulations ÖVN EN 1 and VDE 0100.

The lines in the enclosure are dimensioned according to the specification for single conductors XLPE/EPR copper 90°C.

The motor cables are dimensioned for the maximum continuous current. They apply to 0...100 Hz (up to 300 Hz the cable losses increase about 25 % because of the Skin-effect).



In case of other ambient conditions and different regulations the cable diameters must be adjusted.



If the mains fuses blow the inverter already has a primary defect. Therefore, exchanging the blown fuses and switching the inverter on again is not effective. Consequently, the use of circuit breakers is not advantageous and has additionally the disadvantage of a slower switch-off.



A low cost alternative to screened motor cables is the use of NYCY or NYCWY cables (power cables with concentric protective conductor).




The dimensioning of the pre-fuses, mains cable cross sections and mains cable length has to be done taking into account the available mains short circuit current to ensure a safe switch-off in case of a fault!

If required increase the power of the transformer to reach the necessary short circuit capability.


Cable cross sections at standard design									
		Mains supply				Internal fuse (per phase)	Motor output		
		No. of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)		Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV61EX●● (6-pulse)	D90N4	3	250A	1x (3x 120)	2x 185 (M12)	250 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 95)
	C11N4	3	250A	1x (3x 120)	2x 185 (M12)	250 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 120)
	C13N4	3	315A	1x (3x 185)	2x 185 (M12)	315 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 150)
	C16N4	3	400A	2x (3x 120)	2x 150 (M10)	400 A sf	2x 240 (M12)	2x 240 (M12) or 4x 240 (M12) ¹⁾	2x (3x 95)
	C22N4	3	500A	2x (3x 150)	2x 150 (M10)	500 A sf	2x 240 (M12)	2x 240 (M12) or 4x 240 (M12) ¹⁾	2x (3x 120)
	C25N4	3	630A	2x (3x 185)	2x 300 (M10) ²⁾	630 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C31N4	3	800A	3x (3x 185)	3x 185 (M12)	800 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
	C40N4	3	1000A	4x (3x 185)	4x 300 (M12)	900 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
	C50N4	3	1250A	4x (3x 240)	4x 300 (M12)	2x 630 A sf	4x 240 (M12)	4x 240 (M12)	4x (3x 185)
	C63N4	3	1600A	6x (3x 240)	6x 300 (M12) ²⁾	2x 800 A sf	6x 240 (M12)	6x 240 (M12)	5x (3x 185)
ATV61EXA● (6-pulse)	C63N4	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C71N4	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	C90N4	3	2000A	8x (3x 185)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M11N4	3	2500A	12x (3x 150) or 8x (3x 240)	16x 240 (M12)	4x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M13N4	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M14N4	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)
ATV61EXA● (12-pulse)	C63N4	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C71N4	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	C90N4	6	1000A	2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M11N4	6	1250A	2x [6x (3x 150)] or 2x [4x (3x 240)]	8x 240 (M12)	2x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M13N4	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M14N4	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)

1)at IP54 with separated air flow (ATV61EXS5●●●N4)
 2)Connection only with special cable lugs for switching devices possible

 Differing cable cross sections on request.

Cable cross sections at cable entry via the top									
		Mains supply					Motor output		
		No. of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)	Internal fuse (per phase)	Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV61EX●● (6-pulse)	D90N4	3	250A	1x (3x 120)	2x 150 (M10)	250 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 95)
	C11N4	3	250A	1x (3x 120)	2x 150 (M10)	250 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 120)
	C13N4	3	315A	1x (3x 185)	2x 240 (M12)	315 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 150)
	C16N4	3	400A	2x (3x 120)	2x 240 (M12)	400 A sf	2x 240 (M12)	2x 240 (M12) or 4x 240 (M12) ¹⁾	2x (3x 95)
	C22N4	3	500A	2x (3x 150)	2x 240 (M12)	500 A sf	2x 240 (M12)	2x 240 (M12) or 4x 240 (M12) ¹⁾	2x (3x 120)
	C25N4	3	630A	2x (3x 185)	4x 240 (M12)	630 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C31N4	3	800A	3x (3x 185)	4x 240 (M12)	800 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
	C40N4	3	1000A	4x (3x 185)	4x 240 (M12) or 4x 300 (M12) ¹⁾	900 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
	C50N4	3	1250A	4x (3x 240)	4x 240 (M12) or 4x 300 (M12) ¹⁾	2x 630 A sf	4x 240 (M12)	4x 240 (M12)	4x (3x 185)
	C63N4	3	1600A	6x (3x 240)	6x 240 (M12) or 6x 300 (M12) ¹⁾²⁾	2x 800 A sf	6x 240 (M12)	6x 240 (M12)	5x (3x 185)
ATV61EXA● (6-pulse)	C63N4	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C71N4	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	C90N4	3	2000A	8x (3x 185)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M11N4	3	2500A	12x (3x 150) or 8x (3x 240)	16x 240 (M12)	4x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M13N4	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M14N4	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)
ATV61EXA● (12-pulse)	C63N4	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C71N4	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	C90N4	6	1000A	2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M11N4	6	1250A	2x [6x (3x 150)] or 2x [4x (3x 240)]	8x 240 (M12)	2x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M13N4	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M14N4	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)

1)at IP54 with separated air flow (ATV61EXS5●●●N4)
 2)Connection only with special cable lugs for switching devices possible

 Differing cable cross sections on request.

Motor cable lengths

Because of the permitted mains disturbances, the allowed overvoltages at the motor, the occurring bearing currents and the permitted losses the distance between inverter and motor(s) is limited. The maximum distance heavily depends on the type of motor cable (screened/unscreened) as well as from the used options.

Overvoltages at the motor

Overvoltages at the motor terminals result from reflection in the motor cable. Basically the motors are stressed with measurable higher voltage peaks from a motor cable length of 50 m. Thereby the motor load is nearly independent from the used inverter !

Line supply voltage 400 V	Motor insulation for 1300 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs
---------------------------	--

Line supply voltage 460 V	Motor insulation for 1600 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs
---------------------------	--

In order to use standard motors in this voltage range, the Altivar frequency inverters have a function to inhibit short output voltage pulses. With this function the reflection conditional overvoltages are attenuated. The slew rate as well as the EMC load are not influenced by changing this parameter.

At even longer motor cables the use of a "dv/dt filter" is required. Combined with the cable capacitance the option motor choke affects like a filter and limits the voltage peaks at the motor as well as the slew rate of the output pulses.

When the specified motor cable lengths are observed the motor life time can be significantly extended.

Line supply voltage 400 V	max. 1000 V phase-to-phase peak voltage and dv/dt < 500 V/μs
---------------------------	--

Line supply voltage 460 V	max. 1150 V phase-to-phase peak voltage and dv/dt < 500 V/μs
---------------------------	--



Observing the specified length of motor cables is absolutely necessary to protect the motor !

EMC interferences

The mains rectifier as well as the IGBT inverter cause high-frequent interferences which drain off more and more stronger to the earth potential with increasing motor cable length. As a result the line-conducted interferences to the mains increase. The attenuation of the line reactors is not longer sufficient and the permitted interference limits are exceeded.



Observing the specified length of motor cables is also necessary for compliance with the EMC limits !

Bearing currents

Common mode bearing currents which even cannot be prevented by means of motors equipped with an insulated bearing are significantly reduced by use of the option motor choke.

Especially in case of big motors with middle up to high motor cable lengths the option motor choke is considerable to increase the availability of the motor.

Multiplication factors



The specified lengths of motor cables are recommended limits based on typical motor cables, laying in cable channels, default pulse frequency and maximal output frequency of 100 Hz.

In case of different conditions the recommended cable lengths must be converted by means of the following factors.

If several factors apply, please multiply them.

■ The pulse frequency does not correspond to factory default:

- at 4 kHz multiply all values by 0.7
- at 8 kHz multiply all values by 0.4

■ In case of output frequencies higher than 100 Hz:

- up to 200 Hz multiply all values by 0.8
- up to 300 Hz multiply all values by 0.5

■ Instead of two parallel cables one thicker cable is used: multiply all values by 1.5

■ In case of 6-pole motor cabling (e.g. for star/delta starting circuit): multiply all values by 0.75

■ In case of parallel motors with their centre near the inverter values must be converted in compliance with the number of motors. When an adjusted motor choke is used for each motor, the following values in brackets apply.

- at 2 motors multiply all values by 0.40 (0.80)
- at 3 motors multiply all values by 0.25 (0.60)
- at 4 motors multiply all values by 0.15 (0.40)
- at 5 motors multiply all values by 0.10 (0.25)

■ If the centre of the parallel motors is near the motors, following factors for conversion apply:

- at 2 motors multiply all values by 0.80
- at 3 motors multiply all values by 0.60
- at 4 motors multiply all values by 0.40
- at 5 motors multiply all values by 0.25

Recommended maximum lengths of motor cables in 2nd environment (industrial environment)

C3 (EN 55011 - class A group 2)

no option *)	50 m	screened cable
with motor choke	80 m	screened cable

C4 (EMC concept)

no option *)	100 m	screened cable
with motor choke	300 m	screened cable
no option *)	150 m	unscreened cable
with motor choke	300 m	unscreened cable

*) By means of a software function to inhibit short output voltage pulses the overvoltage at the motor terminals is limited to the double DC voltage. Before you can use this function you have to ensure that the motor is suitable!

Available options

To enlarge the field of applications, various options are available concerning control and operation, extensions referring to the electric arrangement and to increase the protection degree.

General enclosure options

Allocation table for options

Option	Brief description	Order number	Weight [kg]	Reference
Inputs/outputs				
Basic I/O extension card	Terminal extension for additional digital inputs and outputs	VW3 A3E 201	0.320	See product catalogue
Extended I/O extension card	Terminal extension for additional analog and digital inputs and outputs	VW3 A3E 202	0.300	See product catalogue
Control terminals X12	Control terminals for the basic inverter	VW3 AE 1201	0.700	Page 145
Control terminals X12, X13	Control terminals for the basic device and the I/O option cards VW3 A3E 201 and 202.	VW3 AE 1202	0.900	Page 145
Adapter for 115 V logic inputs	Enables the use of 115 V logic signals.	VW3 A3E 101	0.200	See product catalogue
Relay output OC	Relay for digital output (Open collector)	VW3 AE 2201	0.100	Page 146
Multi-pump card	Allows the adaptation to pump applications.	VW3 A3E 502	0.320	See product catalogue
Extended multi-pump card	This card supports all multi-pump applications.	VW3 A3E 503	0.320	See product catalogue
"Controller inside" card	Programmable card for integration of control system functions.	VW3 A3E 501	0.300	See product catalogue
Additional electrical input isolation	Isolated amplifier with optoelectronic potential separation connected to the analog input of the inverter	VW3 AE 1901	0.100	Page 147
Isolated amplifier (output)	Isolated amplifier with optoelectronic potential separation connected to the analog output of the inverter	VW3 AE 1902	0.100	Page 148
Encoder feedback				
Encoder interface card 5 V / RS422	Extension card for encoder feedback. Supply voltage 5 V / RS422	VW3 A3E 401	0.200	See product catalogue
Encoder interface card 12 V OC	Extension card for encoder feedback. Supply voltage 12 V / open collector output	VW3 A3E 403	0.200	
Encoder interface card 15 V OC	Extension card for encoder feedback. Supply voltage 15 V / open collector output	VW3 A3E 404	0.200	
Encoder interface card 12 V (push-pull)	Extension card for encoder feedback. Supply voltage 12 V / push-pull	VW3 A3E 405	0.200	
Encoder interface card 15 V (push-pull)	Extension card for encoder feedback. Supply voltage 15 V / push-pull	VW3 A3E 406	0.200	
Encoder interface card 24 V (push-pull)	Extension card for encoder feedback. Supply voltage 24 V / push-pull	VW3 A3E 407	0.200	
Fieldbuses (buildings)				
LonWorks communication card	Option card for control of the inverter via LonWorks.	VW3 A3E 312	0.300	See product catalogue
METASYS N2 communication card	Option card for control of the inverter via METASYS N2.	VW3 A3E 313	0.300	
APOGEE FLN communication card	Option card for control of the inverter via APOGEE FLN.	VW3 A3E 314	0.300	
BACnet communication card	Option card for control of the inverter via BACnet.	VW3 A3E 315	0.300	

Allocation table for options				
Option	Brief description	Order number	Weight [kg]	Reference
Fieldbuses (industry)				
Modbus TCP/IP communication card	Option card for control of the inverter via Modbus TCP/IP.	VW3 A3E 310	0.300	
Modbus TCP/IP Daisy Chain communication card	Option card for control of the inverter via Modbus TCP/IP Daisy Chain.	VW3 A3E 310d	0.300	
Ethernet/IP communication card	Option card for control of the inverter via Ethernet/IP.	VW3 A3E 316	0.300	
Fipio communication card	Option card for control of the inverter via Fipio.	VW3 A3E 311	0.300	
Modbus Plus communication card	Option card for control of the inverter via Modbus plus.	VW3 A3E 302	0.300	
DeviceNet communication card	Option card for control of the inverter via DeviceNet.	VW3 A3E 309	0.300	
Interbus communication card	Option card for control of the inverter via Interbus.	VW3 A3E 304	0.300	
CC-Link communication card	Option card for control of the inverter via CC-Link.	VW3 A3E 317	0.300	
Modbus/Uni-Telway communication card	Option card for control of the inverter via Modbus/Uni-Telway.	VW3 A3E 303	0.300	
Profibus DP communication card	Option card for control of the inverter via Profibus DP.	VW3 A3E 307	0.300	
Profibus DPv1 communication card	Option card for control of the inverter via Profibus DPv1.	VW3 A3E 307 S371	0.300	
Safety - monitoring of the motor				
Safe standstill with button		VW3 AE 1501	0.100	Page 152
Safe standstill with relay	This function prevents any unintended start-up of the motor and guarantees the safety of the machine and plant personnel.	VW3 AE 1502	0.100	Page 152
Safe standstill with relay (delayed)		VW3 AE 1503	0.100	Page 152
PTC-relay	PTC thermistor relay to monitor the PTC thermistors in the motor	VW3 AE 2001	0.100	Page 149
PTC-relay with PTB certificate	PTC thermistor relay with PTB certificate to monitor the PTC thermistors in the motor in EX-environments	VW3 AE 2002	0.100	Page 150
Pt100 relay for motor winding	Pt100 relay to monitor the Pt100 sensors in the motor winding	VW3 AE 2003	0.300	Page 150
Pt100 relay for motor bearings	Pt100 relay to monitor the Pt100 sensors in the motor bearings	VW3 AE 2004	0.300	Page 150
Pt100 relay for transformer	Pt100 relay to monitor the Pt100 sensors in the transformer	VW3 AE 2005	0.300	Page 150
Further enclosure options				
Insulation monitoring	Monitors each phase to earth fault (only for IT networks)	VW3 AE 2601	5.000	Page 155
Design for IT networks	The frequency inverter will be prepared for the connection to non-grounded networks (IT networks).	VW3 AE 2701	–	Page 155
External 230V AC supply terminals	Provides the terminals and the protection for an external 230 V supply voltage.	VW3 AE 1301	0.100	Page 156
Buffer voltage 24 V DC power supply	24 V DC power supply with fuse protection.	VW3 AE 1401	2.200	Page 157
External 24 V DC supply terminals	Provides the terminals and the protection for an external 24 V buffer voltage.	VW3 AE 1402	0.100	Page 157
Enclosure lighting	Fluorescent lamp and a power socket 230V AC	VW3 AE 1601	1.500	Page 158
Key switch (Local / Remote)	Key switch in the enclosure door for switching between terminals/bus and local operation	VW3 AE 1801	0.200	Page 159
Motor heating	Includes a circuit breaker, a contactor and the terminals to connect a motor heating	VW3 AE 2101	0.200	Page 158
External Motor fan	Includes a circuit breaker, a contactor and the terminals to connect an external motor fan	VW3 AE 2102	0.200	Page 159
Voltmeter 400 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2301	0.400	Page 159
Voltmeter 500 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2302	0.400	Page 159
Voltmeter 690 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2303	0.400	Page 159

See product catalogue

Enclosure options depending on the power		
Option	Brief description	Reference
Braking unit	Limits the DC-voltage at generator operation	Page 161
Door handle for main switch	Enables handling without opening the enclosure door	Page 162
Circuit breaker	Provides a safe switching-off at overload	Page 163
Door handle for circuit breaker	Enables handling without opening the enclosure door	Page 162
Undervoltage coil 230 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 164
Undervoltage coil 110 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 165
230 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 165
110 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 166
Line contactor	Used for the function "line contactor control" to disconnect the drive from the mains	Page 167
12-pulse supply	Contains the components for 12-pulse supply	Page 168
Control transformer	Control transformer 400 V / 230 V	Page 156
Ammeter	Measuring instrument built-in in the enclosure door, which indicates the line current.	Page 169
Enclosure heating	Heats the enclosure to avoid frost and condensation up to an ambient temperature of -10°C	Page 170
Motor choke	Reduces the slew rate on the output of the inverter to protect the motor	Page 171
Sinus filter	Permits nearly sinusoidal motor voltage	Page 172
Cable entry via the top	Allows connection of the line and the motor cables from above	Page 173
Enclosure plinth	200 mm plinth	Page 174
Plinth grill fine	Grill for the front side of the plinth of the enclosure	Page 176
Air condition	Cools the power losses of the control part to avoid filter mats in the enclosure door	Page 176

Allocation table for options depending on the power			
Description	ATV61	Order number	Weight [kg]
Braking unit	EX●●C25N4, C31N4	VW3 A7E 101	31.000
	EXC●C40N4...C63N4	VW3 AE 1003	190.000
	EXS5C40N4...C63N4	VW3 A7E 102	205.000
Door handle for main switch	EX●●D90N4...C13N4	VW3 AE 0103	1.000
	EX●●C16N4...C31N4	VW3 AE 0104	2.000
	EX●●C40N4...C63N4	VW3 AE 0105	2.000
	EXA●C63N4...M14N4	VW3 AE 0105	2.000
Circuit breaker	EX●●D90N4...C13N4	VW3 AE 0106	-
	EX●●C16N4	VW3 AE 0107	1.400
	EX●●C22N4	VW3 AE 0108	1.400
	EX●●C25N4	VW3 AE 0109	1.400
	EX●●C31N4	VW3 AE 0110	9.400
	EX●●C40N4	VW3 AE 0111	-
	EX●●C50N4	VW3 AE 0112	-
	EX●●C63N4	VW3 AE 0113	-
	EXA●C63N4, C71N4	VW3 AE 0113	-
	EXA●C90N4	VW3 AE 0166	-
	EXA●M11N4	VW3 AE 0167	-
EXA●M13N4, M14N4	VW3 AE 0168	-	
Door handle for circuit breaker	EX●●D90N4...C13N4	VW3 AE 0114	1.000
	EX●●C16N4...C25N4	VW3 AE 0115	2.000
	EX●●C31N4...C63N4	VW3 AE 0116	2.000
	EXA●C63N4, C71N4	VW3 AE 0116	2.000
	EXA●C90N4 ... M14N4	-	-
Undervoltage coil 230 V	EX●●D90N4...C25N4	VW3 AE 0117	0.500
	EX●●C31N4...C63N4	VW3 AE 0118	0.500
	EXA●C63N4...M14N4	VW3 AE 0118	0.500
Undervoltage coil 110 V	EX●●D90N4...C25N4	VW3 AE 0119	0.500
	EX●●C31N4...C63N4	VW3 AE 0120	0.500
	EXA●C63N4...M14N4	VW3 AE 0120	0.500

Allocation table for options depending on the power			
Description	ATV61	Order number	Weight [kg]
230 V motor for circuit breaker	EX●●D90N4...C13N4	VW3 AE 0121	0.950
	EX●●C16N4	VW3 AE 0122	3.000
	EX●●C22N4, C25N4	VW3 AE 0123	3.000
	EX●●C31N4, C40N4	VW3 AE 0124	7.000
	EX●●C50N4	VW3 AE 0125	7.000
	EX●●C63N4	VW3 AE 0126	7.000
	EXA●C63N4, C71N4	VW3 AE 0126	7.000
	EXA●C90N4...M14N4	–	–
110 V motor for circuit breaker	EX●●D90N4...C13N4	VW3 AE 0127	0.950
	EX●●C16N4	VW3 AE 0128	3.000
	EX●●C22N4, C25N4	VW3 AE 0129	3.000
	EX●●C31N4, C40N4	VW3 AE 0130	7.000
	EX●●C50N4	VW3 AE 0131	7.000
	EX●●C63N4	VW3 AE 0132	7.000
	EXA●C63N4...C71N4	VW3 AE 0132	7.000
	EXA●C90N4...M14N4	–	–
Line contactor	EX●●D90N4	VW3 AE 0206	7.000
	EX●●C11N4	VW3 AE 0207	7.000
	EX●●C13N4	VW3 AE 0218	10.000
	EX●●C16N4	VW3 AE 0208	11.000
	EXC●C22N4	VW3 AE 0209	12.000
	EXS5C22N4...C31N4	VW3 AE 0216	10.000
	EXC●C25N4	VW3 AE 0210	14.000
	EXC●C31N4	VW3 AE 0211	21.000
	EX●●C40N4	VW3 AE 0211	21.000
	EX●●C50N4	VW3 AE 0213	28.000
	EX●●C63N4	VW3 AE 0214	42.000
	EXA●C63N4, C71N4	VW3 AE 0227 ¹⁾	42.000
	EXA●C90N4	VW3 AE 0224	84.000
	EXA●M11N4, M13N4	VW3 AE 0224	84.000
	EXA●M14N4	VW3 AE 0224	84.000
¹⁾ When this option is used together with a line reactor, the option VW3 AE 0225 (50.000 kg) must be ordered additionally!			
12-pulse supply	EXA●C63N4, C71N4	VW3 AE 2416	–
	EXA●C90N4	VW3 AE 2418	–
	EXA●M11N4	VW3 AE 2419	–
	EXA●M13N4, M14N4	VW3 AE 2420	–
Line reactor	EXA●C63N4, C71N4	VW3 AE 2501	132.000
	EXA●C90N4	VW3 AE 2502	202.000
	EXA●M11N4...M14N4	VW3 AE 2503	264.000
Control transformer, 230 V	EX●●D90N4...C22N4	VW3 AE 0302	8.000
	EX●●C25N4...C63N4	VW3 AE 0303	11.000

Allocation table for options depending on the power			
Description	ATV61	Order number	Weight [kg]
Amperemeter	EX●●D90N4	VW3 AE 0404	0.200
	EX●●C11N4...C16N4	VW3 AE 0406	0.200
	EX●●C22N4, C25N4	VW3 AE 0426	0.200
	EX●●C31N4, C40N4	VW3 AE 0409	0.200
	EX●●C50N4	VW3 AE 0427	0.200
	EX●●C63N4	VW3 AE 0411	0.200
	EXA●C63N4, C71N4	VW3 AE 0411 (6p) VW3 AE 0421 (12p)	0.200
	EXA●C90N4	VW3 AE 0413 (6p) VW3 AE 0421 (12p)	0.200
	EXA●M11N4	VW3 AE 0414 (6p) VW3 AE 0429 (12p)	0.200
	EXA●M13N4, M14N4	VW3 AE 0415 (6p) VW3 AE 0423 (12p)	0.200
Enclosure heating	EX●●D90N4...C31N4	VW3 AE 0501	0.500
	EX●●C40N4...C63N4	VW3 AE 0502	1.000
	EXA●C63N4...C71N4	VW3 AE 0502	1.000
	EXA●C90N4...M14N4	VW3 AE 0503	1.500
Motor choke ²⁾	EXC●D90N4	VW3 AE 0603	17.000
	EXS5D90N4	VW3 AE 0615	37.000
	EXC●C11N4, C13N4	VW3 AE 0604	35.000
	EXS5C11N4	VW3 AE 0616	55.000
	EXS5C13N4	VW3 AE 0617	55.000
	EXC●C16N4, C22N4	VW3 AE 0605	64.000
	EXS5C16N4	VW3 AE 0618	154.000
	EXS5C22N4	VW3 AE 0619	157.000
	EXC●C25N4, C31N4	VW3 AE 0606	102.000
	EXS5C25N4, C31N4	VW3 AE 0621	192.000
	EXC2C40N4	VW3 AE 0608	222.000
	EXC5C40N4	VW3 AE 0612	222.000
	EXS5C40N4	VW3 AE 0623	222.000
	EXC2C50N4	VW3 AE 0609	228.000
	EXC5C50N4	VW3 AE 0613	228.000
	EXS5C50N4	VW3 AE 0624	228.000
	EXC2C63N4	VW3 AE 0610	234.000
	EXC5C63N4	VW3 AE 0614	234.000
	EXS5C63N4	VW3 AE 0625	234.000
	EXA●C63N4...C71N4	VW3 AE 0635	132.000
EXA●C90N4...M14N4	VW3 AE 0636	264.000	
²⁾ The option motor choke cannot be combined with the option sinus filter or the option cable entry via the top!			
Sinus filter ³⁾	EXC2D90N4, C11N4	VW3 AE 0641	318.000
	EXC5D90N4, C11N4	VW3 AE 0653	348.000
	EXS5D90N4, C11N4	VW3 AE 0665	318.000
	EXC2C13N4	VW3 AE 0643	357.000
	EXC5C13N4	VW3 AE 0655	357.000
	EXS5C13N4	VW3 AE 0667	357.000
	EXC2C16N4	VW3 AE 0644	365.000
	EXC5C16N4	VW3 AE 0656	365.000
	EXS5C16N4	VW3 AE 0668	365.000
	EXC2C22N4	VW3 AE 0646	384.000
	EXC5C22N4	VW3 AE 0658	384.000
	EXS5C22N4	VW3 AE 0670	384.000
	EXC2C25N4, C31N4	VW3 AE 0648	434.000
	EXC5C25N4, C31N4	VW3 AE 0660	434.000
	EXS5C25N4, C31N4	VW3 AE 0672	434.000
	EXC2C40N4	VW3 AE 0650	870.000
	EXC5C40N4	VW3 AE 0662	870.000
	EXS5C40N4	VW3 AE 0674	870.000

Allocation table for options depending on the power

Description	ATV61	Order number	Weight [kg]
	EXC2C50N4	VW3 AE 0651	870.000
	EXC5C50N4	VW3 AE 0663	900.000
	EXS5C50N4	VW3 AE 0675	900.000
	EXC2C63N4	VW3 AE 0652	900.000
	EXC5C63N4	VW3 AE 0664	930.000
	EXS5C63N4	VW3 AE 0676	930.000

³⁾ The option sinus filter cannot be combined with the option motor choke or the option cable entry via the top!

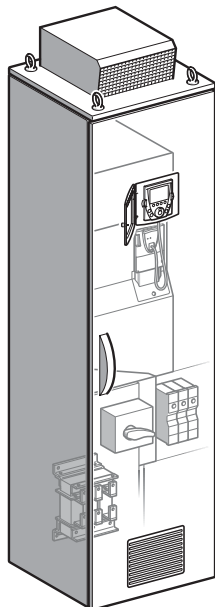
Cable entry via the top ⁴⁾					
Without motor choke		EXC●D90N4...C13N4	VW3 AE 0705	108.000	
		EXS5D90N4...C13N4	VW3 AE 0715	123.000	
		EXC●C16N4	VW3 AE 0706	108.000	
		EXS5C16N4	VW3 AE 0727	123.000	
		EXC●C22N4	VW3 AE 0707	108.000	
		EXS5C22N4	VW3 AE 0717	123.000	
		EXC●C25N4, C31N4	VW3 AE 0708	126.000	
		EXS5C25N4, C31N4	VW3 AE 0718	141.000	
		EXC●C40N4	VW3 AE 0709	216.000	
		EXS5C40N4	VW3 AE 0719	123.000	
		EXC●C50N4	VW3 AE 0710	252.000	
		EXS5C50N4	VW3 AE 0720	141.000	
		EXC●C63N4	VW3 AE 0711	252.000	
		EXS5C63N4	VW3 AE 0721	141.000	
		EXA●C63N4...C71N4	VW3 AE 0740	126.000	
		EXA●C90N4...M14N4	VW3 AE 0741	150.000	
	With motor choke		EXC●D90N4...C13N4	VW3 AE 0705	108.000
			EXS5D90N4...C13N4	VW3 AE 0715	123.000
			EXC●C16N4	VW3 AE 0706	108.000
			EXS5C16N4	VW3 AE 0727	123.000
		EXC●C22N4	VW3 AE 0707	108.000	
		EXS5C22N4	VW3 AE 0722	123.000	
		EXC●C25N4, C31N4	VW3 AE 0708	126.000	
		EXS5C25N4, C31N4	VW3 AE 0723	141.000	
		EXC●C40N4	VW3 AE 0712	108.000	
		EXS5C40N4	VW3 AE 0724	–	
		EXC●C50N4	VW3 AE 0713	126.000	
		EXS5C50N4	VW3 AE 0725	–	
		EXC●C63N4	VW3 AE 0714	126.000	
		EXS5C63N4	VW3 AE 0726	–	
		EXA●C63N4...C71N4	VW3 AE 0740	126.000	
		EXA●C90N4...M14N4	VW3 AE 0741	150.000	

⁴⁾ The option cable entry via the top cannot be combined with the option sinus filter!

Allocation table for options depending on the power				
Description		ATV61	Order number	Weight [kg]
Enclosure plinth 200 mm	Without motor choke	EXC●D90N4...C22N4	VW3 AE 0801	11.000
		EXC●C25N4, C31N4	VW3 AE 0802	13.000
		EXC●C40N4, C50N4	VW3 AE 0803	15.000
		EXC●C63N4	VW3 AE 0804	17.000
		EXA●C63N4...C71N4	VW3 AE 0820 ⁵⁾	38.000
		EXA●C90N4...M14N4	VW3 AE 0822	69.000
	With motor choke	EXC●D90N4...C22N4	VW3 AE 0801	11.000
		EXC●C25N4, C31N4	VW3 AE 0802	13.000
		EXC●C40N4, C50N4	VW3 AE 0805	24.000
		EXC●C63N4	VW3 AE 0806	26.000
		EXA●C63N4...C71N4	VW3 AE 0820 ⁵⁾	38.000
		EXA●C90N4...M14N4	VW3 AE 0822	69.000
	with line reactor	EXA●C63N4...C71N4	VW3 AE 0820 ⁵⁾	38.000
		EXA●C90N4...M14N4	VW3 AE 0824	78.000
⁵⁾ When using a line reactor and a line contactor the option VW3 AE 0821 (40.000 kg) has to be used instead of the option VW3 AE 0820.				
Additional enclosure plinth for cable entry via the top	Without motor choke	EXC●D90N4...C31N4	VW3 AE 0807	9.000
		EXC●C40N4...C63N4	VW3 AE 0808	18.000
		EXA●C63N4...C71N4	VW3 AE 0825	9.000
		EXA●C90N4...M14N4	VW3 AE 0826	11.000
	With motor choke	EXC●D90N4...C31N4	VW3 AE 0807	9.000
		EXC●C40N4...C63N4	VW3 AE 0809	9.000
		EXA●C63N4...C71N4	VW3 AE 0825	9.000
		EXA●C90N4...M14N4	VW3 AE 0826	11.000
Additional enclosure plinth		EXC●C25N4, C31N4	_ ⁶⁾	-
For braking unit		EXC●C40N4...C63N4	VW3 AE 0810	9.000
⁶⁾ Therefore is no extra enclosure plinth necessary				
Additional enclosure plinth for sinus filter		EXC●D90N4...C31N4	VW3 AE 0816	11.000
		EXC●C40N4...C63N4	VW3 AE 0817	13.000
Plinth grill fine		EXS5D90N4...C22N4	VW3 AE 0812	2.000
		EXS5C25N4, C31N4	VW3 AE 0813	3.000
		EXS5C40N4, C50N4	VW3 AE 0814	4.000
		EXS5C63N4	VW3 AE 0815	5.000
Air condition	Without motor choke	EXS5D90N4, C11N4	VW3 AE 0901	29.500
		EXS5C13N4	VW3 AE 0902	29.500
		EXS5C16N4	VW3 AE 0903	26.500
		EXS5C22N4	VW3 AE 0904	56.000
		EXS5C25N4, C31N4	VW3 AE 0905	71.000
		EXS5C40N4	VW3 AE 0906	71.000
		EXS5C50N4	VW3 AE 0907	71.000
		EXS5C63N4	VW3 AE 0908	86.000
	With motor choke	EXS5D90N4	VW3 AE 0909	56.000
		EXS5C11N4	VW3 AE 0910	56.000
		EXS5C13N4	VW3 AE 0911	56.000
		EXS5C16N4	VW3 AE 0913	56.000
		EXS5C22N4	VW3 AE 0914	71.000
		EXS5C25N4, C31N4	VW3 AE 0915	71.000
		EXS5C40N4	VW3 AE 0916	71.000
		EXS5C50N4	VW3 AE 0917	86.000
EXS5C63N4	VW3 AE 0918	86.000		

Inverters in standard enclosures for 500 V networks

The basic equipment contains:



- Frequency inverter ATV61 with integrated EMC filter
- Mains connection on main switch
- Main switch (without door handle)
- Superfast semiconductor fuses for inverter protection
- Line reactor
For ATV61EXA●●●N the line reactor is available as option.
- LCD operating panel (mounted into the enclosure door)
- Terminals/bars for motor connection
- Control transformer for 400 V and 230 V to supply the cooling system as well as optional components.
- Protection degree IP23:
air inlet through the enclosure door, air outlet through the enclosure roof.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid in the enclosure door.
- Protection degree IP54:
air inlet through the enclosure door, air outlet through fan on the top.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid with filter in the enclosure door.
- Protection degree IP54 with separated air flow:
air flow through the plinth of the enclosure and mounted air guidance hood. Cooling of the control part by means of filter fans in the enclosure door.
- Inflow coolant temperature 0...40°C
(up to 50°C with derating)
- Enclosure Sarel S6000, color RAL 7032
- Multilingual operating instructions
- Documentation-CD-ROM with parameterization instructions, fieldbus instructions, operating and parameterizing software,...
- Enclosure layout plans consisting of circuit diagram, terminal connection table, list of materials and design drawing

Description

Altivar 61 Plus

ATV61EX●●●●●N

Line supply voltage 500 V

General technical data	
Input	
Voltage	500 (525) V $\pm 10\%$ for TT, TN-C, TN-S or IT networks *)
Frequency	50 / 60 Hz $\pm 5\%$ *)
Overvoltage class	Class III according to EN 50178
*) Technical data and remarks for mains voltages are given in chapter "Mains conditions", page 21.	
Output	
Control method	Vector-oriented flux control without feedback, V/f characteristic, energy saving system
Voltage	3 AC 0...100% mains voltage, dynamic voltage stabilization
Overload	20 % for 60 seconds per 10 minutes, 35 % for 2 seconds
Pulse frequency	2.5 kHz, adjustable from 2...4.9 kHz
Frequency / Base frequency	0.1...500 Hz / 25...500 Hz, adjustable
Short circuit protection	All-pole protected against short circuit and earth fault by means of overcurrent switch-off
Design	Floor-standing enclosure
Cooling	forced
Frequency resolution, digital	0.01 Hz / 50 Hz, frequency stability: $\pm 0.01\%$ / 50 Hz
Speed accuracy	V/f mode: slip frequency VC without feedback 0.3 x slip frequency
Mechanical strength	
Mechanical vibration	According to IEC/EN 60068-2-6 1.5 mm at 3...10 Hz, 0.6 g at 10...200 Hz (3M3 according to IEC/EN 60721-3-3)
Shock	According to IEC/EN 60068-2-27 4 g for 11 ms (3M2 according to IEC/EN 60721-3-3)
Ambient conditions	
Operating temperature	0...+40°C (-10...+40°C with enclosure heating) 3K3 according to IEC/EN 60721-3-3 up to +50°C with derating
Storage / Transport temperature	-25...+70°C
Protection degree	selective: ATV61EXC2●●●N ... IP23 ATV61EXC5●●●N ... IP54 with air intake through filter mats ATV61EXS5●●●N ... IP54 with separated air flow ATV61EXA2●●●N ... IP23 with internal cooling circuit ATV61EXA5●●●N ... IP54 with internal cooling circuit
Environmental class / Humidity	Class 3K3 in accordance with IEC/EN 60721-3-3 / no condensation, max. 95 % relative humidity
Altitude	Up to 1000 m, beyond power decrease of 1 % per 100 m up to 3000 m
Allowed pollution	Pollution degree: for IP23 design: pollution degree 2 according to EN 61800-5-1 for IP54 design: pollution degree 3 according to EN 61800-5-1 Chemical / mechanical classification: 3C2 and 3S2 according to EN 60721-3-3
Protection class	Class 1 according to EN 50178
Standards	
Basic standard	The devices are designed, built and tested on the basis of EN 50178.
EMC immunity	According to EN 61800-3, 1st and 2nd environment (IEC 1000-4-2; IEC 1000-4-3; IEC 1000-4-4; IEC 1000-4-5; IEC 1000-4-6)
EMC emission	In accordance with product standard EN 61800-3, 2nd environment, category C3, at IT networks category C4
Insulation	Galvanic insulation in accordance with EN 50178 PELV (Protective Extra Low Voltage)
Standards	CE



Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

Protection degree ATV61EXC● and ATV61EXS5

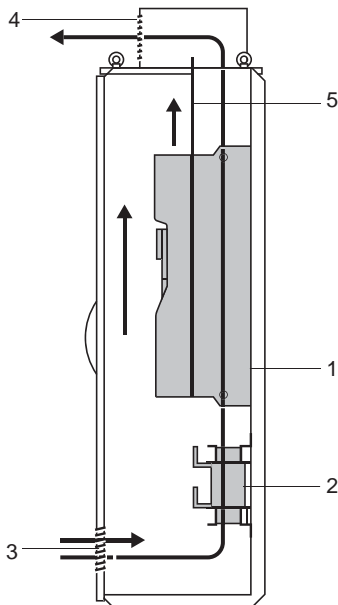
In order to adapt the utmost robust Altivar product line with enclosure design optimal to the individual requests of the system, these enclosure units are available in three different designs. Each solution contains a clearly specified and tested cooling system which provides highest operating safety.

The standard design of the ATV61 enclosure units complies with protection degree IP23. If a higher protection degree is desired or required, there are two IP54 solutions available.

- IP54 with filter mats
- IP54 with separated air flow

Overview of standardised protection degrees

ATV61EXC2 - Standard enclosure design IP23



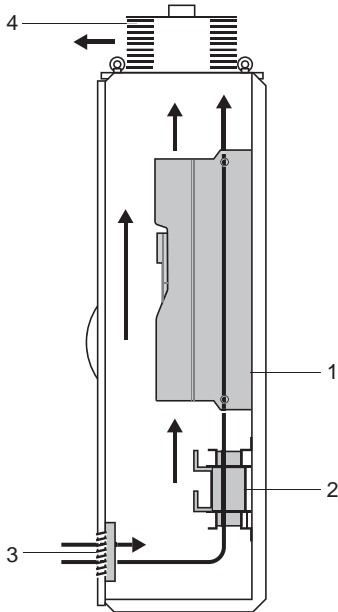
In this case the input of the cooling air takes place by the enclosure door and the output through the top of the enclosure. The air flow must not be constrained by means of fixtures or filter mats.

- 1 Frequency inverter ATV61
- 2 Line reactor
- 3 Air inlet grid (without filter mat) for control part and power part
- 4 Metal cover with splash water protection
- 5 Guided air flow to avoid internal air short-cuts

Protection degree: IP23

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV61EXC5 - Enclosure design IP54



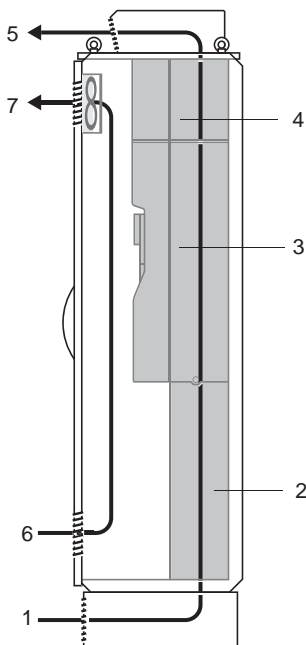
At protection degree IP54 with filter mats the input of the cooling air takes place through the filter mats in the enclosure door and the output through the fan at the top of the enclosure.

- 1 Frequency inverter ATV61
- 2 Line reactor
- 3 Air inlet grid (with filter mat)
- 4 Fan (with filter mat)

Protection degree: IP54

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV61EXS5 - Enclosure design IP54 with separated air flow



In case of protection degree IP54 with separate air channel the cooling air inlet for the power part takes place through the plinth and the air outlet through the enclosure roof. The control part is cooled by filter fans in the enclosure door or by an optional air condition.

- 1 Cooling air for power part (via enclosure plinth)
- 2 Air guidance channel
- 3 Frequency inverter ATV61
- 4 DC choke
(at ATV61EXS5●●●●N and ATV61EXS5●●●●Y instead of the DC choke a line reactor is delivered in a separate supply field)
- 5 Air outlet through metal grid with splash water protection
- 6 Air inlet (with filter mat) for control part
- 7 Air outlet (with filter fan) for control part

Protection degree: IP54

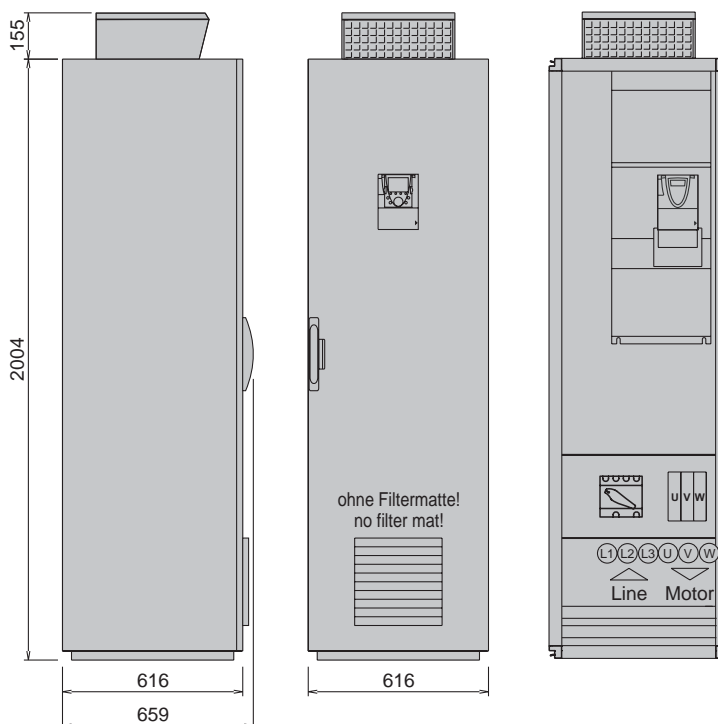
Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

Technical data ATV61EXC● and ATV61EXS5					
Type		ATV61EX●● D90N	C11N	C13N	C16N
Built-in standard device		ATV61HC11Y	ATV61HC13Y	ATV61HC16Y	ATV61HC20Y
Nominal data					
Motor rating					
P_N [kW]	$V_N = 500\text{ V}$	90	110	132	160
Continuous output current					
I_N [A]	$V_N = 500\text{ V}$	136	165	200	240
Maximum current for 60 s per 10 minutes					
I_{MAX} [A]	$V_N = 500\text{ V}$	163	198	240	288
Input					
Input current					
I_{IN} [A]	$V_N = 500\text{ V}$	128	153	182	218
Continuous apparent power					
S_N [kVA]	$V_N = 500\text{ V}$	111	133	158	189
Braking unit					
P_{CONT}/P_{MAX} [kW]		90/108	110/132	132/158	160/192
R_{MIN}/R_{MAX} [Ω]		4	4	4	4
Characteristics					
Efficiency [%]		97.0	97.0	97.2	97.2
Losses [W]	at I_N	2700	3190	3840	4680
Weight net/gross [kg]					
ATV61EXC2●●●N		320/360	320/360	370/410	370/410
ATV61EXC5●●●N		330/370	330/370	380/420	380/420
ATV61EXS5●●●N		395/445	395/445	445/495	445/495
Ambient conditions					
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	600 / 600 / 600	600 / 600 / 600	600 / 600 / 600	600 / 600 / 600
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	64 / 65 / 64	64 / 65 / 64	64 / 65 / 64	64 / 65 / 64
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 100	100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version

ATV61EXC2D90N ... C16N



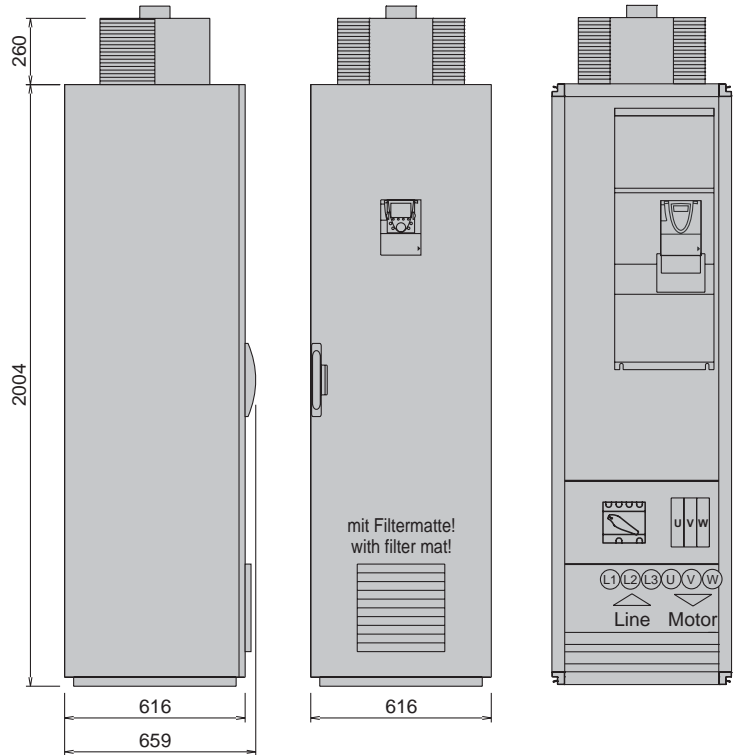
Altivar 61 Plus

ATV61EX●●●●●N

Line supply voltage 500 V

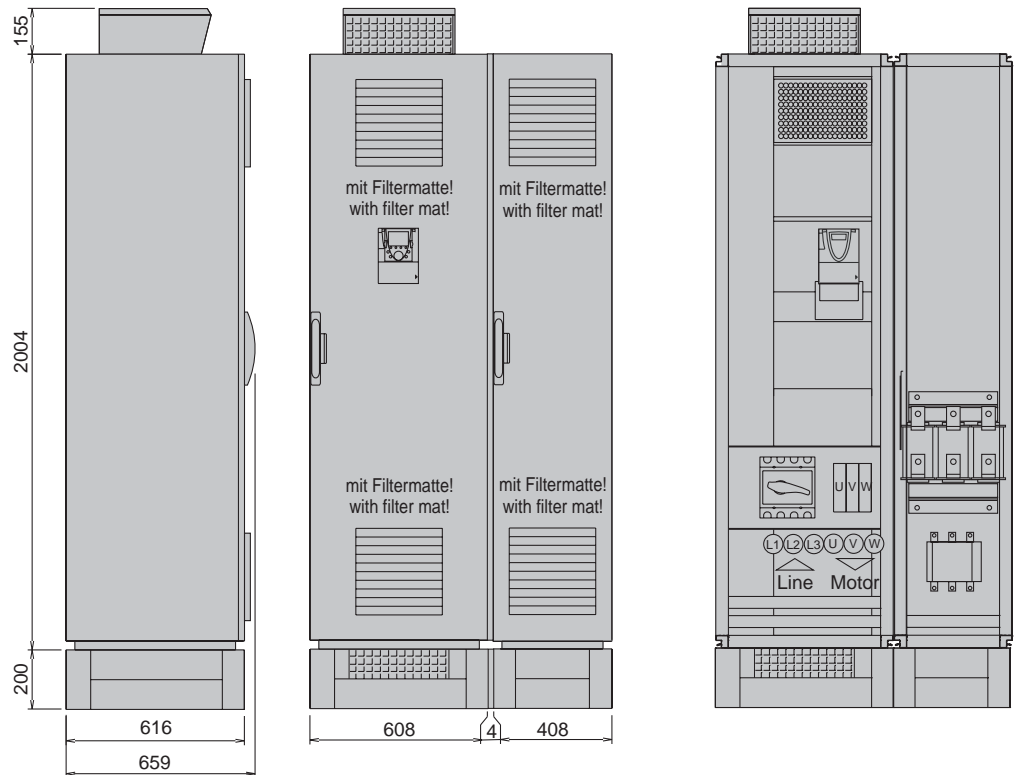
Dimensions: IP54CV Compact version

ATV61EXC5D90N ... C16N



Dimensions: IP54SA with separated air flow

ATV61EXS5D90N ... C16N



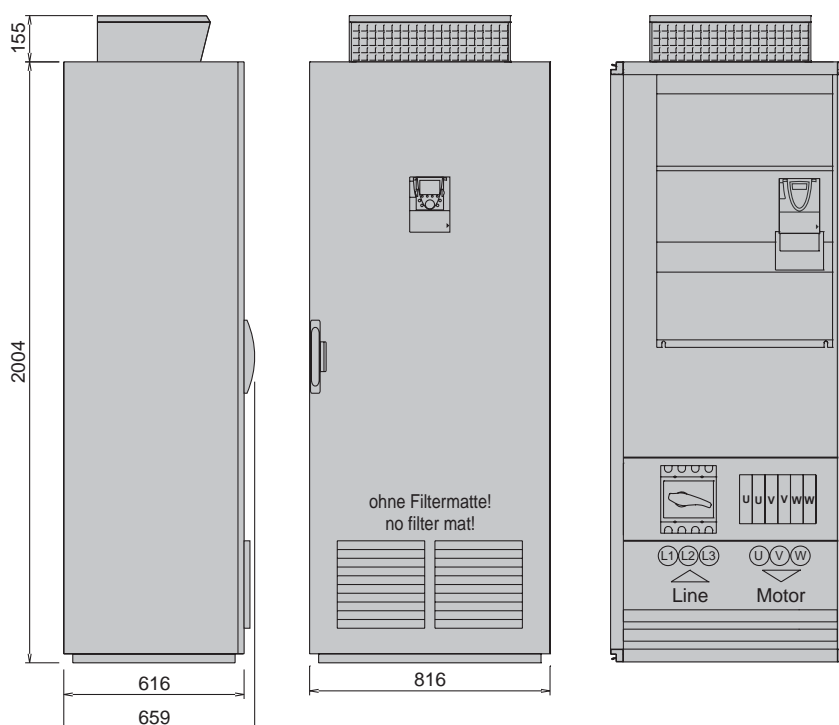
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV61EX●●	C20N	C25N	C31N
Built-in standard device	ATV61HC25Y	ATV61HC31Y	ATV61HC40Y	
Nominal data				
Motor rating				
P_N [kW]	$V_N = 500\text{ V}$	200	250	315
Continuous output current				
I_N [A]	$V_N = 500\text{ V}$	312	390	462
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 500\text{ V}$	374	468	554
Input				
Input current				
I_{IN} [A]	$V_N = 500\text{ V}$	277	342	426
Continuous apparent power				
S_N [kV]	$V_N = 500\text{ V}$	240	296	369
Braking unit				
P_{CONT}/P_{MAX} [kW]		200/240	250/300	315/378
R_{MIN}/R_{MAX} [Ω]		2	2	2
Characteristics				
Efficiency [%]		97.2	97.2	97.2
Losses [W]	at I_N	5820	7200	8680
Weight net/gross [kg]				
ATV61EXC2●●●N		455/500	505/550	505/550
ATV61EXC5●●●N		455/500	505/550	505/550
ATV61EXS5●●●N		515/570	565/620	565/620
Volume of cooling air [m ³ /h] EXC2 / EXC5 / EXS5				
		1200 / 1200 / 1200	1200 / 1200 / 1200	1200 / 1200 / 1200
Sound pressure level [dB(A)] EXC2 / EXC5 / EXS5				
		66 / 68 / 72	66 / 68 / 72	66 / 68 / 72
Mains short circuit current [kA] *) EXC2 / EXC5 / EXS5				
		100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version

ATV61EXC2C20N ... C31N



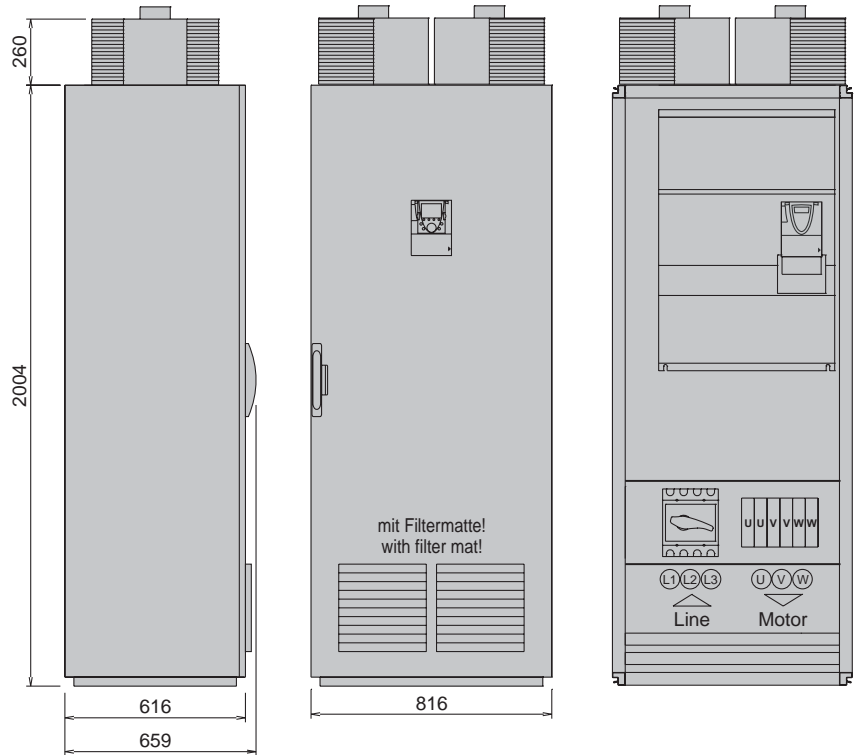
Altivar 61 Plus

ATV61EX●●●●●N

Line supply voltage 500 V

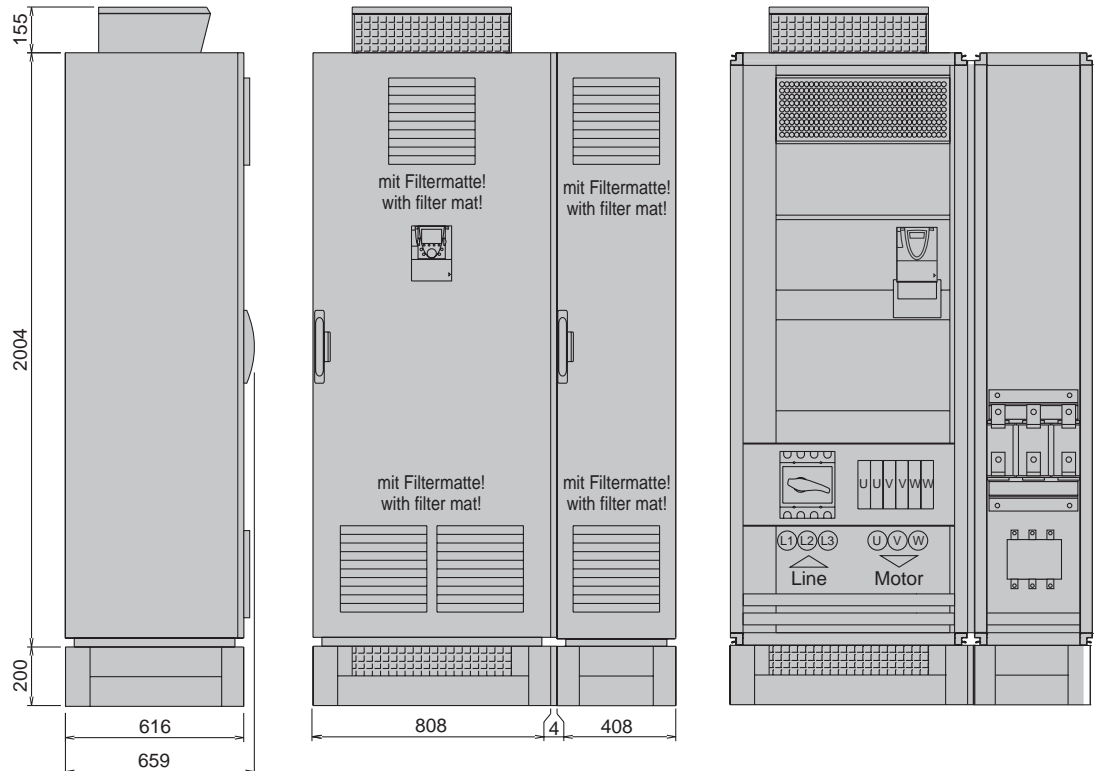
Dimensions: IP54CV Compact version

ATV61EXC5C20N ... C31N



Dimensions: IP54SA with separated air flow

ATV61EXS5C20N ... C31N



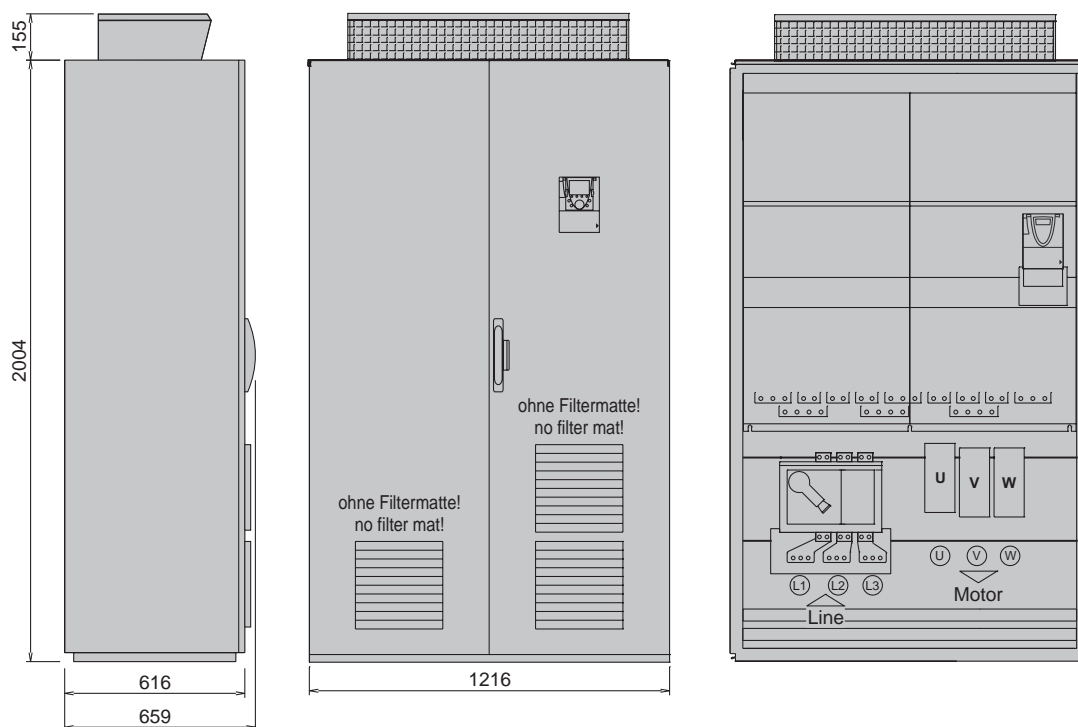
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV61EX●●			
	C40N	C50N	C63N	
Built-in standard device	ATV61HC50Y	ATV61HC63Y	ATV61HC80Y	
Nominal data				
Motor rating				
P_N [kW]	$V_N = 500$ V	400	500	630
Continuous output current				
I_N [A]	$V_N = 500$ V	590	740	900
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 500$ V	708	888	1080
Input				
Input current				
I_{IN} [A]	$V_N = 500$ V	547	673	847
Continuous output power				
S_N [kW]	$V_N = 500$ V	474	583	734
Braking unit				
P_{CONT}/P_{MAX} [kW]		400/480	500/600	630/756
R_{MIN}/R_{MAX} [Ω]		1	1	1
Characteristics				
Efficiency [%]		97.3	97.3	97.3
Losses [W]	at I_N	11020	13730	17230
Weight net/gross [kg]				
ATV61EXC2●●●N		770/825	860/915	860/915
ATV61EXC5●●●N		800/855	890/945	890/945
ATV61EXS5●●●N		845/910	935/100	935/100
Ambient conditions				
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	2400 / 2400 / 2400	2400 / 2400 / 2400	2400 / 2400 / 2400
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	69 / 79 / 73	69 / 79 / 73	69 / 79 / 73
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version

ATV61EXC2C40N ... C63N



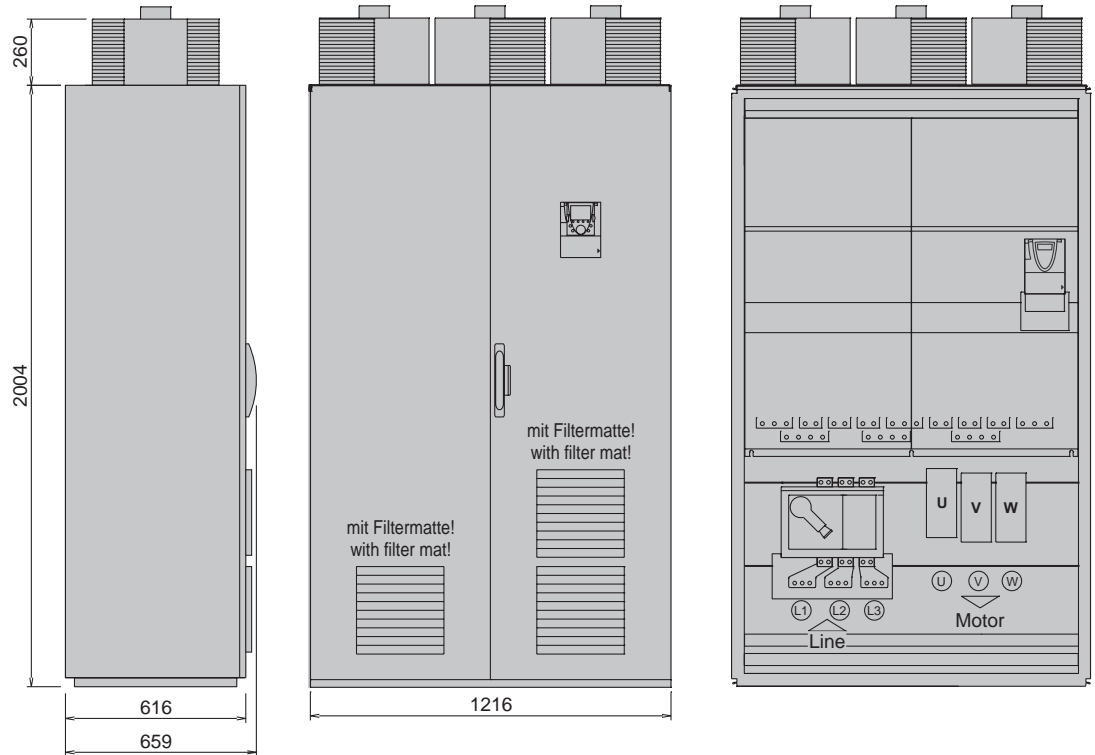
Altivar 61 Plus

ATV61EX●●●●●N

Line supply voltage 500 V

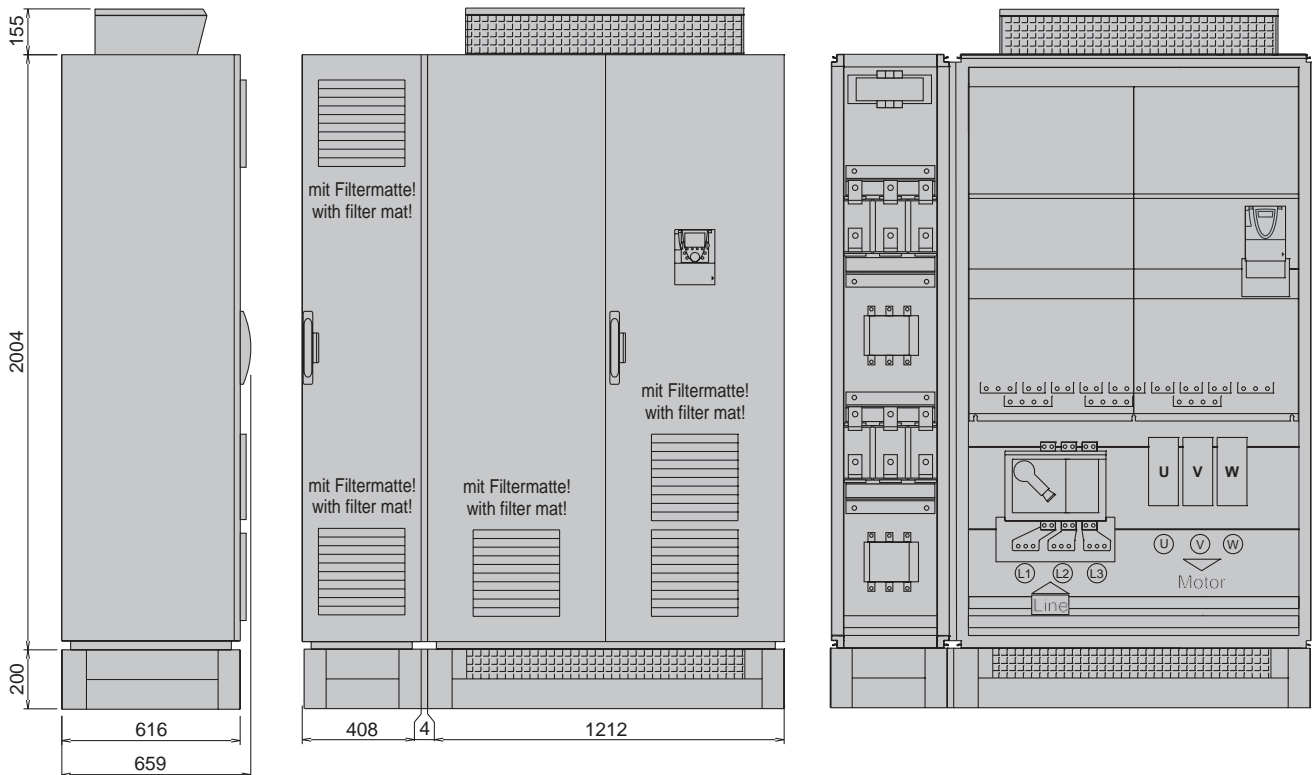
Dimensions: IP54CV Compact version

ATV61EXC5C40N ... C63N



Dimensions: IP54SA with separated air flow

ATV61EXS5C40N ... C63N



The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Altivar 61 Plus

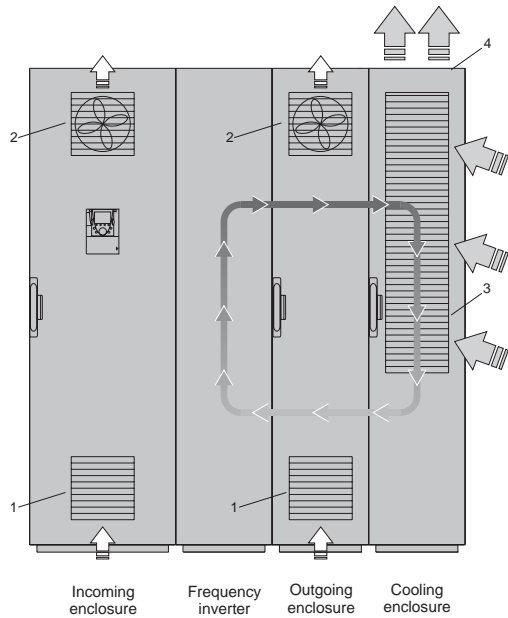
ATV61EX●●●●●N

Line supply voltage 500 V

Protection degree ATV61EXA●

Overview of available protection degrees

ATV61EXA2 - Enclosure design IP23 with internal cooling circuit



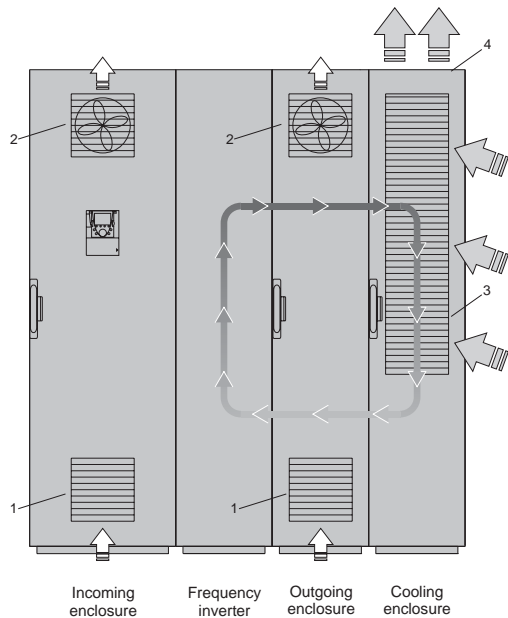
In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by fans in the enclosure door.

- 1 Air inlet grid
- 2 Air outlet with fans
- 3 Air inlet grid with fans for power part
- 4 Air outlet grid for power part

Protection degree: IP23

Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

ATV61EXA5 - Enclosure design IP54 with internal cooling circuit



In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by filter fans in the enclosure door.

- 1 Air inlet grid with filter mats
- 2 Air outlet with filter fans
- 3 Air inlet grid with fans for power part
- 4 Air outlet grid for power part

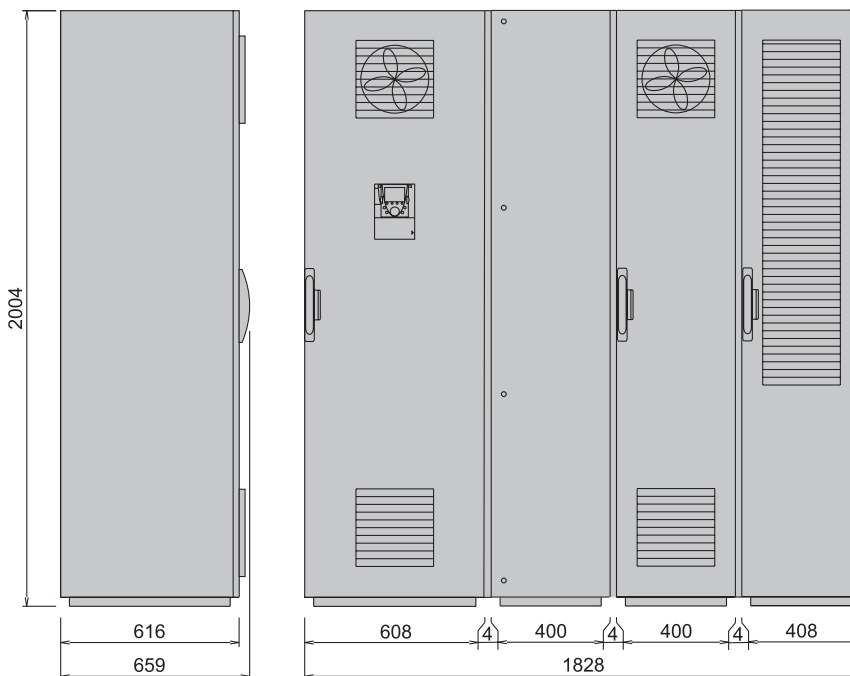
Protection degree: IP54

Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

Technical data ATV61EXA●				
Type		ATV61EXA● C63N	C80N	C90N
Internal inverter unit		ATV61EC80YE1	ATV61EM10YE1	ATV61EM12YE1
Nominal data				
Motor rating				
P_N [kW]	$V_N = 500$ V	630	800	900
Continuous output current				
I_N [A]	$V_N = 500$ V	920	1100	1230
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 500$ V	1104	1320	1476
Input				
Input current				
I_{IN} [A]	$V_N = 500$ V	862	1107	1212
Continuous apparent power				
S_N [kVA]	$V_N = 500$ V	747	959	1050
Characteristics				
Efficiency [%]		> 98.0	> 98.0	> 98.0
Losses [kW]	at I_N	13.2	16.4	19.5
Weight net/gross [kg]		900/950	900/950	900/950
Ambient conditions				
Volume of cooling air [m ³ /h]		5500	5500	5500
Sound pressure level [dB(A)]		77	77	77
Mains short circuit current [kA] *)		100	100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions: ATV61EXA●C63N, C80N, C90N

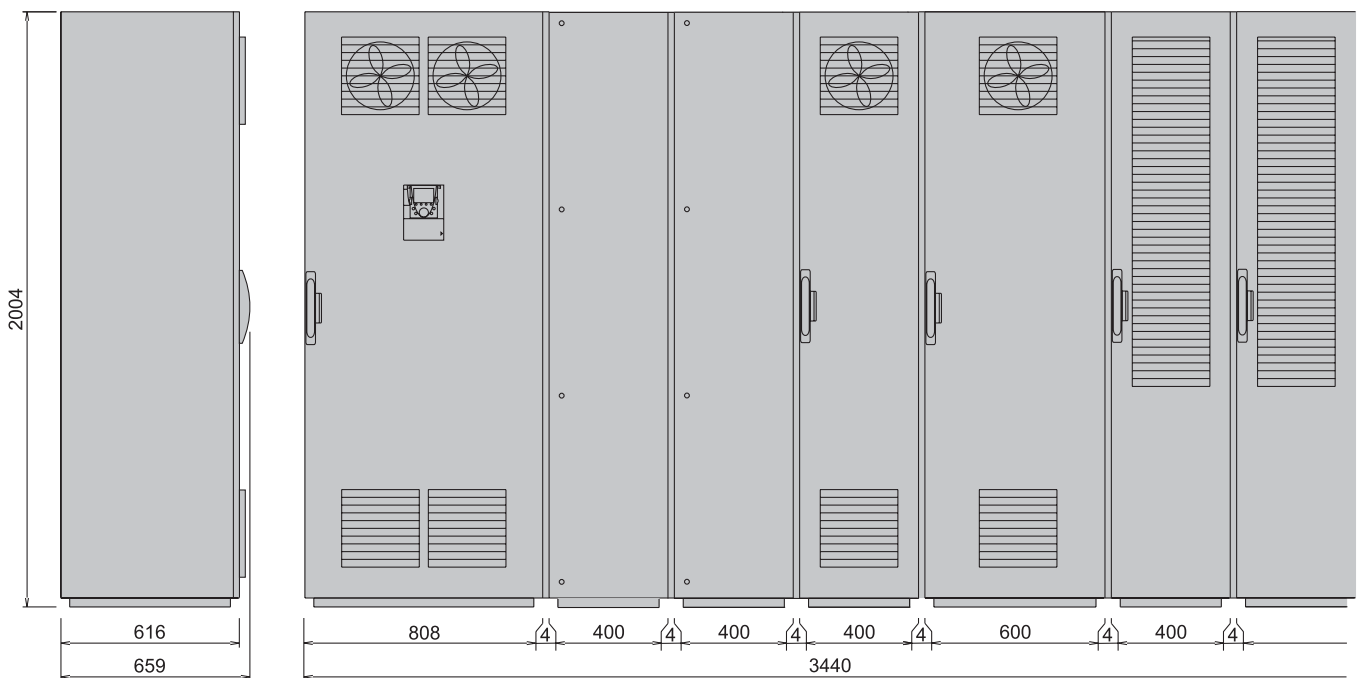


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV61EXA●				
	M11N	M13N	M15N	M18N	
Internal inverter unit	ATV61EM15YE1	ATV61EM18YE1	ATV61EM21YE1	ATV61EM24YE1	
Nominal data					
Motor rating					
P_N [kW]	$V_N = 500$ V	1100	1300	1500	1800
Continuous output current					
I_N [A]	$V_N = 500$ V	1580	1860	2140	2430
Maximum current for 60 s per 10 minutes					
I_{MAX} [A]	$V_N = 500$ V	1896	2232	2568	2916
Input					
Input current					
I_{IN} [A]	$V_N = 500$ V	1474	1771	2026	2402
Continuous apparent power					
S_N [kVA]	$V_N = 500$ V	1277	1534	1755	2080
Characteristics					
Efficiency [%]		> 98.0	> 98.0	> 98.0	> 98.0
Losses [kW]	at I_N	24.7	29.2	33.8	38.8
Weight net/gross [kg]		1850/1925	1850/1925	1850/1925	1850/1925
Ambient conditions					
Volume of cooling air [m ³ /h]		11000	11000	11000	11000
Sound pressure level [dB(A)]		79	79	79	79
Mains short circuit current [kA *)		100	100	100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions: ATV61EXA●M11N, M13N, M15N, M18N

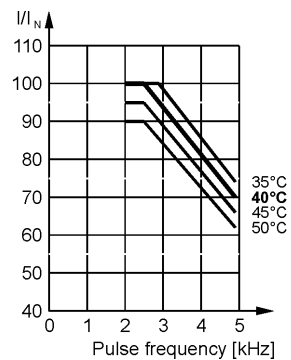


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

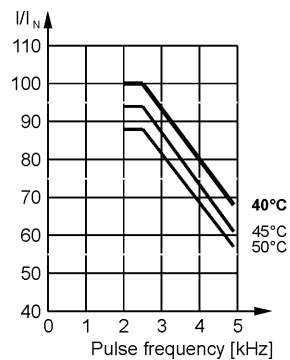
Power decrease

Depending on the chosen pulse frequency and the maximum ambient temperature a power increase is possible or a power reduction is necessary. This can be determined by means of the following diagrams.

ATV 61EX●●D90N ... EX●●C63N



ATV 61EXA●C63N ... EXA●M18N



Please observe the following guidelines to guarantee trouble-free operation of the drive:

- At higher pulse frequencies the allowed motor cable length is reduced (see chapter "Motor cable lengths").
- Select a motor that is at most one type bigger.



If the heat sink temperature is too high, the pulse frequency is automatically reduced to prevent an overload of the inverter.

Fuses and cable cross sections

The Altivar enclosure designs have input fuses built-in as standard. These fuses are for the case that the electronic protective mechanism of the inverter fails. So they are a secondary protection of the inverter to protect the power cables against overload and to protect the input rectifier against an internal short-circuit.

The below-mentioned diameters for 3-wire cables are recommended values for laying the cable in air at max. 40°C ambient temperature, based on the regulations ÖVN EN 1 and VDE 0100.

The lines in the enclosure are dimensioned according to the specification for single conductors XLPE/EPR copper 90°C.

The motor cables are dimensioned for the maximum continuous current. They apply to 0...100 Hz (up to 300 Hz the cable losses increase about 25 % because of the Skin-effect).



In case of other ambient conditions and different regulations the cable diameters must be adjusted.



If the mains fuses blow the inverter already has a primary defect. Therefore, exchanging the blown fuses and switching the inverter on again is not effective. Consequently, the use of circuit breakers is not advantageous and has additionally the disadvantage of a slower switch-off.



A low cost alternative to screened motor cables is the use of NYCY or NYCWY cables (power cables with concentric protective conductor).




The dimensioning of the pre-fuses, mains cable cross sections and mains cable length has to be done taking into account the available mains short circuit current to ensure a safe switch-off in case of a fault!

If required increase the power of the transformer to reach the necessary short circuit capability.

Cable cross sections at standard design									
		Mains supply				Internal fuse (per phase)	Motor output		
		No. of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)		Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV61EX●● (6-pulse)	D90N	3	160A	1x (3x 70)	2x 120 (M8)	160 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 70)
	C11N	3	200A	1x (3x 95)	2x 120 (M8)	200 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 70)
	C13N	3	250A	1x (3x 120)	2x 185 (M12)	250 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 95)
	C16N	3	315A	1x (3x 185)	2x 185 (M12)	315 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 120)
	C20N	3	400A	2x (3x 120)	2x 150 (M10)	400 A sf	4x 240 (M12)	4x 240 (M12)	1x (3x 185)
	C25N	3	500A	2x (3x 150)	2x 150 (M10)	500 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 120)
	C31N	3	630A	2x (3x 185)	2x 300 (M10) ²⁾	630 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C40N	3	800A	3x (3x 185)	4x 300 (M12)	2x 400 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
	C50N	3	1000A	4x (3x 185)	4x 300 (M12)	2x 500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
	C63N	3	1250A	4x (3x 240)	4x 300 (M12)	2x 630 A sf	4x 240 (M12)	4x 240 (M12)	4x (3x 185)
ATV61EXA● (6-pulse)	C63N	3	1250A	6x (3x 150) or 4x (3x 240)	10x 240 (M12)	2x 630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C80N	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C90N	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M11N	3	2000A	8x (3x 185)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M13N	3	2500A	12x (3x 150) or 8x (3x 240)	16x 240 (M12)	4x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M15N	3	3200A	12x (3x 185)	16x 240 (M12)	4x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M18N	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)
ATV61EXA● (12-pulse)	C63N	6	630A	2x [3x (3x 150)] or 2x [2x (3x 240)]	4x 240 (M12)	630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C80N	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C90N	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M11N	6	1000A	2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M13N	6	1250A	2x [6x (3x 150)] or 2x [4x (3x 240)]	8x 240 (M12)	2x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M15N	6	1600A	2x [6x (3x 185)]	8x 240 (M12)	2x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M18N	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)

- 1)at IP54 with separated air flow (ATV61EXS5●●●N)
- 2)Connection only with special cable lugs for switching devices possible

 Differing cable cross sections on request.

Cable cross sections at cable entry via the top									
		Mains supply				Internal fuse (per phase)	Motor output		
		No. of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)		Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV61EX●● (6-pulse)	D90N	3	160A	1x (3x 70)	2x 150 (M10)	160 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 70)
	C11N	3	200A	1x (3x 95)	2x 150 (M10)	200 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 70)
	C13N	3	250A	1x (3x 120)	2x 150 (M10)	250 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 95)
	C16N	3	315A	1x (3x 185)	2x 240 (M12)	315 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 120)
	C20N	3	400A	2x (3x 120)	4x 240 (M12)	400 A sf	4x 240 (M12)	4x 240 (M12)	1x (3x 185)
	C25N	3	500A	2x (3x 150)	4x 240 (M12)	500 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 120)
	C31N	3	630A	2x (3x 185)	4x 240 (M12)	630 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C40N	3	800A	3x (3x 185)	4x 240 (M12)	2x 400 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
	C50N	3	1000A	4x (3x 185)	4x 240 (M12)	2x 500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
C63N	3	1250A	4x (3x 240)	4x 240 (M12)	2x 630 A sf	4x 240 (M12)	4x 240 (M12)	4x (3x 185)	
ATV61EXA● (6-pulse)	C63N	3	1250A	6x (3x 150) or 4x (3x 240)	10x 240 (M12)	2x 630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C80N	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C90N	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M11N	3	2000A	8x (3x 185)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M13N	3	2500A	12x (3x 150) or 8x (3x 240)	16x 240 (M12)	4x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M15N	3	3200A	12x (3x 185)	16x 240 (M12)	4x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M18N	3	3200A	16x (3x 150)] or 12x (3x 240)	16x 240 (M12)	4x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)
ATV61EXA● (12-pulse)	C63N	6	630A	2x [3x (3x 150)] or 2x [2x (3x 240)]	4x 240 (M12)	630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	C80N	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	C90N	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M11N	6	1000A	2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M13N	6	1250A	2x [6x (3x 150)] or 2x [4x (3x 240)]	8x 240 (M12)	2x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M15N	6	1600A	2x [6x (3x 185)]	8x 240 (M12)	2x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M18N	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)



Differing cable cross sections on request.

Motor cable lengths

Because of the permitted mains disturbances, the allowed overvoltages at the motor, the occurring bearing currents and the permitted losses the distance between inverter and motor(s) is limited. The maximum distance heavily depends on the type of motor cable (screened/unscreened) as well as from the used options.

Overvoltages at the motor

Overvoltages at the motor terminals result from reflection in the motor cable. Basically the motors are stressed with measurable higher voltage peaks from a motor cable length of 50 m. Thereby the motor load is nearly independent from the used inverter !

Line supply voltage 500 V Motor insulation for 1600 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs

In order to use standard motors in this voltage range, the Altivar frequency inverters have a function to inhibit short output voltage pulses. With this function the reflection conditional overvoltages are attenuated. The slew rate as well as the EMC load are not influenced by changing this parameter.

At even longer motor cables the use of a "dv/dt filter" is required. Combined with the cable capacitance the option motor choke affects like a filter and limits the voltage peaks at the motor as well as the slew rate of the output pulses.

When the specified motor cable lengths are observed the motor life time can be significantly extended.

Line supply voltage 500 V max. 1300 V phase-to-phase peak voltage and dv/dt < 750 V/μs



Observing the specified length of motor cables is absolutely necessary to protect the motor !

EMC interferences

The mains rectifier as well as the IGBT inverter cause high-frequent interferences which drain off more and more stronger to the earth potential with increasing motor cable length. As a result the line-conducted interferences to the mains increase. The attenuation of the line reactors is not longer sufficient and the permitted interference limits are exceeded.



Observing the specified length of motor cables is also necessary for compliance with the EMC limits !

Bearing currents

Common mode bearing currents which even cannot be prevented by means of motors equipped with an insulated bearing are significantly reduced by use of the option motor choke.

Especially in case of big motors with middle up to high motor cable lengths the option motor choke is considerable to increase the availability of the motor.

Multiplication factors



The specified lengths of motor cables are recommended limits based on typical motor cables, laying in cable channels, default pulse frequency and maximal output frequency of 100 Hz.

In case of different conditions the recommended cable lengths must be converted by means of the following factors.

If several factors apply, please multiply them.

- The pulse frequency does not correspond to factory default:

at 4 kHz multiply all values by 0.7

- In case of output frequencies higher than 100 Hz:

up to 200 Hz multiply all values by 0.8

up to 300 Hz multiply all values by 0.5

- Instead of two parallel cables one thicker cable is used: multiply all values by 1.5

- In case of 6-pole motor cabling (e.g. for star/delta starting circuit): multiply all values by 0.75

- In case of parallel motors with their centre near the inverter values must be converted in compliance with the number of motors. When an adjusted motor choke is used for each motor, the following values in brackets apply.

at 2 motors multiply all values by 0.40 (0.80)

at 3 motors multiply all values by 0.25 (0.60)

at 4 motors multiply all values by 0.15 (0.40)

at 5 motors multiply all values by 0.10 (0.25)

- If the centre of the parallel motors is near the motors, following factors for conversion apply:

at 2 motors multiply all values by 0.80

at 3 motors multiply all values by 0.60

at 4 motors multiply all values by 0.40

at 5 motors multiply all values by 0.25

Recommended maximum lengths of motor cables in 2nd environment (industrial environment)

C3 (EN 55011 - class A group 2)

no option	15 m	screened cable
with motor choke	50 m	screened cable

C4 (EMC concept)

with motor choke	150 m	screened cable
no option	30 m	unscreened cable
with motor choke	250 m	unscreened cable

Available options

To enlarge the field of applications, various options are available concerning control and operation, extensions referring to the electric arrangement and to increase the protection degree.

General enclosure options

Allocation table for options

Option	Brief description	Order number	Weight [kg]	Reference
Inputs/outputs				
Basic I/O extension card	Terminal extension for additional digital inputs and outputs	VW3 A3E 201	0.320	See product catalogue
Extended I/O extension card	Terminal extension for additional analog and digital inputs and outputs	VW3 A3E 202	0.300	See product catalogue
Control terminals X12	Control terminals for the basic inverter	VW3 AE 1201	0.700	Page 145
Control terminals X12, X13	Control terminals for the basic device and the I/O option cards VW3 A3E 201 and 202.	VW3 AE 1202	0.900	Page 145
Adapter for 115 V logic inputs	Enables the use of 115 V logic signals.	VW3 A3E 101	0.200	See product catalogue
Relay output OC	Relay for digital output (Open collector)	VW3 AE 2201	0.100	Page 146
Multi-pump card	Allows the adaptation to pump applications.	VW3 A3E 502	0.320	See product catalogue
Extended multi-pump card	This card supports all multi-pump applications.	VW3 A3E 503	0.320	See product catalogue
"Controller inside" card	Programmable card for integration of control system functions.	VW3 A3E 501	0.300	See product catalogue
Additional electrical input isolation	Isolated amplifier with optoelectronic potential separation connected to the analog input of the inverter	VW3 AE 1901	0.100	Page 147
Isolated amplifier (output)	Isolated amplifier with optoelectronic potential separation connected to the analog output of the inverter	VW3 AE 1902	0.100	Page 148
Encoder feedback				
Encoder interface card 5 V / RS422	Extension card for encoder feedback. Supply voltage 5 V / RS422	VW3 A3E 401	0.200	See product catalogue
Encoder interface card 12 V OC	Extension card for encoder feedback. Supply voltage 12 V / open collector output	VW3 A3E 403	0.200	
Encoder interface card 15 V OC	Extension card for encoder feedback. Supply voltage 15 V / open collector output	VW3 A3E 404	0.200	
Encoder interface card 12 V (push-pull)	Extension card for encoder feedback. Supply voltage 12 V / push-pull	VW3 A3E 405	0.200	
Encoder interface card 15 V (push-pull)	Extension card for encoder feedback. Supply voltage 15 V / push-pull	VW3 A3E 406	0.200	
Encoder interface card 24 V (push-pull)	Extension card for encoder feedback. Supply voltage 24 V / push-pull	VW3 A3E 407	0.200	
Fieldbuses (buildings)				
LonWorks communication card	Option card for control of the inverter via LonWorks.	VW3 A3E 312	0.300	See product catalogue
METASYS N2 communication card	Option card for control of the inverter via METASYS N2.	VW3 A3E 313	0.300	
APOGEE FLN communication card	Option card for control of the inverter via APOGEE FLN.	VW3 A3E 314	0.300	
BACnet communication card	Option card for control of the inverter via BACnet.	VW3 A3E 315	0.300	

Allocation table for options				
Option	Brief description	Order number	Weight [kg]	Reference
Fieldbuses (industry)				
Modbus TCP/IP communication card	Option card for control of the inverter via Modbus TCP/IP.	VW3 A3E 310	0.300	
Modbus TCP/IP Daisy Chain communication card	Option card for control of the inverter via Modbus TCP/IP Daisy Chain.	VW3 A3E 310d	0.300	
Ethernet/IP communication card	Option card for control of the inverter via Ethernet/IP.	VW3 A3E 316	0.300	
Fipio communication card	Option card for control of the inverter via Fipio.	VW3 A3E 311	0.300	
Modbus Plus communication card	Option card for control of the inverter via Modbus plus.	VW3 A3E 302	0.300	
DeviceNet communication card	Option card for control of the inverter via DeviceNet.	VW3 A3E 309	0.300	
Interbus communication card	Option card for control of the inverter via Interbus.	VW3 A3E 304	0.300	
CC-Link communication card	Option card for control of the inverter via CC-Link.	VW3 A3E 317	0.300	
Modbus/Uni-Telway communication card	Option card for control of the inverter via Modbus/Uni-Telway.	VW3 A3E 303	0.300	
Profibus DP communication card	Option card for control of the inverter via Profibus DP.	VW3 A3E 307	0.300	
Profibus DPv1 communication card	Option card for control of the inverter via Profibus DPv1.	VW3 A3E 307 S371	0.300	
Safety - monitoring of the motor				
Safe standstill with button		VW3 AE 1501	0.100	Page 152
Safe standstill with relay	This function prevents any unintended start-up of the motor and guarantees the safety of the machine and plant personnel.	VW3 AE 1502	0.100	Page 152
Safe standstill with relay (delayed)		VW3 AE 1503	0.100	Page 152
PTC-relay	PTC thermistor relay to monitor the PTC thermistors in the motor	VW3 AE 2001	0.100	Page 149
PTC-relay with PTB certificate	PTC thermistor relay with PTB certificate to monitor the PTC thermistors in the motor in EX-environments	VW3 AE 2002	0.100	Page 150
Pt100 relay for motor winding	Pt100 relay to monitor the Pt100 sensors in the motor winding	VW3 AE 2003	0.300	Page 150
Pt100 relay for motor bearings	Pt100 relay to monitor the Pt100 sensors in the motor bearings	VW3 AE 2004	0.300	Page 150
Pt100 relay for transformer	Pt100 relay to monitor the Pt100 sensors in the transformer	VW3 AE 2005	0.300	Page 150
Further enclosure options				
Insulation monitoring	Monitors each phase to earth fault (only for IT networks)	VW3 AE 2601	5.000	Page 155
Design for IT networks	The frequency inverter will be prepared for the connection to non-grounded networks (IT networks).	VW3 AE 2701	–	Page 155
External 230V AC supply terminals	Provides the terminals and the protection for an external 230 V supply voltage.	VW3 AE 1301	0.100	Page 156
Buffer voltage 24 V DC power supply	24 V DC power supply with fuse protection.	VW3 AE 1401	2.200	Page 157
External 24 V DC supply terminals	Provides the terminals and the protection for an external 24 V buffer voltage.	VW3 AE 1402	0.100	Page 157
Enclosure lighting	Fluorescent lamp and a power socket 230V AC	VW3 AE 1601	1.500	Page 158
Key switch (Local / Remote)	Key switch in the enclosure door for switching between terminals/bus and local operation	VW3 AE 1801	0.200	Page 159
Motor heating	Includes a circuit breaker, a contactor and the terminals to connect a motor heating	VW3 AE 2101	0.200	Page 158
External Motor fan	Includes a circuit breaker, a contactor and the terminals to connect an external motor fan	VW3 AE 2102	0.200	Page 159
Voltmeter 400 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2301	0.400	Page 159
Voltmeter 500 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2302	0.400	Page 159
Voltmeter 690 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2303	0.400	Page 159

See product catalogue

Enclosure options depending on the power		
Option	Brief description	Reference
Braking unit	Limits the DC-voltage at generator operation	Page 161
Door handle for main switch	Enables handling without opening the enclosure door	Page 162
Circuit breaker	Provides a safe switching-off at overload	Page 163
Door handle for circuit breaker	Enables handling without opening the enclosure door	Page 164
Undervoltage coil 230 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 164
Undervoltage coil 110 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 165
230 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 165
110 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 166
Line contactor	Used for the function "line contactor control" to disconnect the drive from the mains	Page 167
12-pulse supply	Contains the components for 12-pulse supply	Page 168
Amperemeter	Measuring instrument built-in in the enclosure door, which indicates the line current.	Page 169
Enclosure heating	Heats the enclosure to avoid frost and condensation up to an ambient temperature of -10°C	Page 170
Motor choke	Reduces the slew rate on the output of the inverter to protect the motor	Page 171
Cable entry via the top	Allows connection of the line and the motor cables from above	Page 173
Enclosure plinth	200 mm plinth	Page 174
Plinth grill fine	Grill for the front side of the plinth of the enclosure	Page 176
Air condition	Cools the power losses of the control part to avoid filter mats in the enclosure door	Page 176

Allocation table for options depending on the power			
Description	ATV61	Order number	Weight [kg]
Braking unit	EXC●C20N...C31N	VW3 AE 1004	190.000
	EXS5C20N...C31N	VW3 A7E 103	205.000
	EXC●C40N...C63N	VW3 AE 1005	190.000
	EXS5C40N...C63N	VW3 A7E 104	205.000
Door handle for main switch	EX●●D90N...C16N	VW3 AE 0103	1.000
	EX●●C20N...C31N	VW3 AE 0104	2.000
	EX●●C40N...C63N	VW3 AE 0105	2.000
	EXA●C63N...M18N	VW3 AE 0105	2.000
Circuit breaker	EX●●D90N	VW3 AE 0141	–
	EX●●C11N	VW3 AE 0142	–
	EX●●C13N	VW3 AE 0144	–
	EX●●C16N	VW3 AE 0145	4.000
	EX●●C20N	VW3 AE 0146	1.400
	EX●●C25N	VW3 AE 0147	1.400
	EX●●C31N	VW3 AE 0148	1.400
	EX●●C40N	VW3 AE 0150	–
	EX●●C50N	VW3 AE 0151	–
	EX●●C63N	VW3 AE 0152	–
	EXA●C63N	VW3 AE 0169	–
	EXA●C80N, C90N	VW3 AE 0170	–
	EXA●M11N	VW3 AE 0171	–
	EXA●M13N	VW3 AE 0172	–
EXA●M15N, M18N	VW3 AE 0173	–	
Door handle for circuit breaker	EX●●C11N...C13N	VW3 AE 0114	1.000
	EX●●C16N...C31N	VW3 AE 0115	2.000
	EX●●C40N...C63N	VW3 AE 0116	2.000
	EXA●C63N...C90N	VW3 AE 0116	2.000
	EXA●M11N...M18N	–	–
Undervoltage coil 230V	EX●●C90N...C40N	VW3 AE 0117	0.500
	EX●●C50N...C63N	VW3 AE 0118	0.500
	EXA●C63N...M18N	VW3 AE 0118	0.500

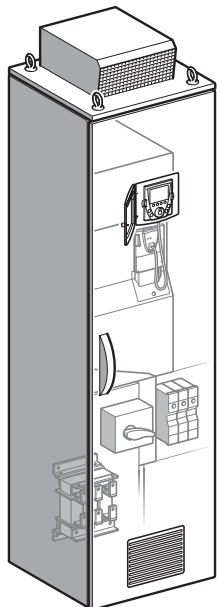
Allocation table for options depending on the power			
Description	ATV61	Order number	Weight [kg]
Undervoltage coil 110V	EX●●C90N...C40N	VW3 AE 0119	0.500
	EX●●C50N...C63N	VW3 AE 0120	0.500
	EXA●C63N...M18N	VW3 AE 0120	0.500
230V motor for circuit breaker	EX●●D90N	VW3 AE 0154	1.000
	EX●●C11N, C13N	VW3 AE 0155	1.000
	EX●●C16N, C20N	VW3 AE 0156	3.000
	EX●●C25N, C31N	VW3 AE 0157	3.000
	EX●●C40N	VW3 AE 0158	7.000
	EX●●C50N, C63N	VW3 AE 0159	7.000
	EXA●C63N	VW3 AE 0176	7.000
	EXA●C80N, C90N	VW3 AE 0177	7.000
	EXA●M11N...M18N	–	–
110V motor for circuit breaker	EX●●D90N	VW3 AE 0160	1.000
	EX●●C11N, C13N	VW3 AE 0161	1.000
	EX●●C16N, C20N	VW3 AE 0162	3.000
	EX●●C25N, C31N	VW3 AE 0163	3.000
	EX●●C40N	VW3 AE 0164	7.000
	EX●●C50N, C63N	VW3 AE 0165	7.000
	EXA●C63N	VW3 AE 0179	7.000
	EXA●C80N, C90N	VW3 AE 0180	7.000
	EXA●M11N...M18N	–	–
Line contactor	EX●●D90N	VW3 AE 0205	4.000
	EX●●C11N	VW3 AE 0206	7.000
	EX●●C13N, C16N	VW3 AE 0218	10.000
	EX●●C20N	VW3 AE 0209	12.000
	EX●●C25N, C31N	VW3 AE 0210	14.000
	EX●●C40N	VW3 AE 0212	24.000
	EX●●C50N, C63N	VW3 AE 0213	28.000
	EXA●C63N...C90N	VW3 AE 0227 ¹⁾	42.000
	EXA●M11N	VW3 AE 0226	84.000
	EXA●M13N, M15N	VW3 AE 0226	84.000
	EXA●M18N	VW3 AE 0226	84.000
¹⁾ When this option is used together with a line reactor, the option VW3 AE 0225 (50.000 kg) must be ordered additionally!			
12-pulse supply	EXA●C63N	VW3 AE 2415	–
	EXA●C80N, C90N	VW3 AE 2416	–
	EXA●M11N	VW3 AE 2418	–
	EXA●M13N	VW3 AE 2419	–
	EXA●M15N, M18N	VW3 AE 2420	–
Line reactor	EXA●C63N	VW3 AE 2504	154.000
	EXA●C80N	VW3 AE 2505	121.000
	EXA●C90N	VW3 AE 2506	136.000
	EXA●M11N	VW3 AE 2507	308.000
	EXA●M13N, M15N	VW3 AE 2508	242.000
EXA●M18N	VW3 AE 2509	273.000	

Allocation table for options depending on the power				
Description	ATV61	Order number	Weight [kg]	
Amperemeter	EX●●D90N, C11N	VW3 AE 0404	0.200	
	EX●●C13N...C20N	VW3 AE 0406	0.200	
	EX●●C25N, C31N	VW3 AE 0426	0.200	
	EX●●C40N	VW3 AE 0409	0.200	
	EX●●C50N	VW3 AE 0409	0.200	
	EX●●C63N	VW3 AE 0427	0.200	
	EXA●C63N	VW3 AE 0427 (6p) VW3 AE 0428 (12p)	0.200	
	EXA●C80N, C90N	VW3 AE 0411 (6p) VW3 AE 0421 (12p)	0.200	
	EXA●M11N	VW3 AE 0413 (6p) VW3 AE 0421 (12p)	0.200	
	EXA●M13N, M15N	VW3 AE 0414 (6p) VW3 AE 0429 (12p)	0.200	
	EXA●M18N	VW3 AE 0415 (6p) VW3 AE 0423 (12p)	0.200	
	Enclosure heating	EX●●D90N...C31N	VW3 AE 0501	0.500
		EX●●C40N...C63N	VW3 AE 0502	1.000
EXA●C63N...C90N		VW3 AE 0502	1.000	
EXA●M11N...M18N		VW3 AE 0503	1.500	
Motor choke	EX●●D90N, C11N	VW3 AE 0603	17.000	
	EX●●C13N, C16N	VW3 AE 0604	35.000	
	EX●●C20N, C25N	VW3 AE 0605	64.000	
	EX●●C31N	VW3 AE 0606	102.000	
	EXC2C40N	VW3 AE 0626	192.000	
	EXC5C40N	VW3 AE 0628	192.000	
	EXS5C40N	VW3 AE 0630	197.000	
	EXC2C50N, C63N	VW3 AE 0627	234.000	
	EXC5C50N, C63N	VW3 AE 0629	234.000	
	EXS5C50N, C63N	VW3 AE 0631	234.000	
	EXA●C63N...C90N	VW3 AE 0635	132.000	
	EXA●M11N...M18N	VW3 AE 0636	264.000	
Cable entry via the top	Without motor choke	EXC●D90N...C16N	VW3 AE 0728	108.000
		EXS5D90N...C16N	VW3 AE 0732	–
		EXC●C20N...C31N	VW3 AE 0729	126.000
		EXS5C20N...C31N	VW3 AE 0733	–
		EXC●C40N...C63N	VW3 AE 0730	252.000
		EXS5C40N...C63N	VW3 AE 0734	252.000
		EXA●C63N...C90N	VW3 AE 0740	126.000
		EXA●M11N...M18N	VW3 AE 0741	150.000
	With motor choke	EXC●D90N...C16N	VW3 AE 0728	108.000
		EXS5D90N...C16N	VW3 AE 0735	108.000
		EXC●C20N...C31N	VW3 AE 0729	126.000
		EXS5C20N...C31N	VW3 AE 0736	126.000
		EXC●C40N...C63N	VW3 AE 0731	126.000
		EXS5C40N...C63N	VW3 AE 0737	252.000
		EXA●C63N...C90N	VW3 AE 0740	126.000
		EXA●M11N...M18N	VW3 AE 0741	150.000

Allocation table for options depending on the power					
Description		ATV61	Order number	Weight [kg]	
Enclosure plinth 200 mm	No option	EXC●D90N...C16N	VW3 AE 0801	11.000	
		EXC●C20N...C31N	VW3 AE 0802	13.000	
		EXC●C40N...C63N	VW3 AE 0804	17.000	
		EXA●C63N...C90N	VW3 AE 0820 ²⁾	38.000	
		EXA●M11N...M18N	VW3 AE 0822	69.000	
	With motor choke	EXC●D90N...C16N	VW3 AE 0801	11.000	
		EXC●C20N...C31N	VW3 AE 0802	13.000	
		EXC●C40N...C63N	VW3 AE 0806	26.000	
		EXA●C63N...C90N	VW3 AE 0820 ²⁾	38.000	
		EXA●M11N...M18N	VW3 AE 0822	69.000	
	with line reactor	EXA●C63N...C90N	VW3 AE 0820 ²⁾	38.000	
		EXA●M11N...M18N	VW3 AE 0824	78.000	
	²⁾ When using a line reactor and a line contactor the option VW3 AE 0821 (40.000 kg) has to be used instead of the option VW3 AE 0820.				
	Additional enclosure plinth for cable entry via the top	Without motor choke	EXC●D90N...C31N	VW3 AE 0807	9.000
EXC●C40N...C63N			VW3 AE 0808	18.000	
EXA●C63N...C90N			VW3 AE 0825	9.000	
EXA●M11N...M18N			VW3 AE 0826	11.000	
With motor choke		EXC●D90N...C31N	VW3 AE 0807	9.000	
		EXC●C40N...C63N	VW3 AE 0809	9.000	
		EXA●C63N...C90N	VW3 AE 0825	9.000	
		EXA●M11N...M18N	VW3 AE 0826	11.000	
Additional enclosure plinth for braking unit		EXC●C20N...C63N	VW3 AE 0810	9.000	
Plinth grill fine		EXS5D90N...C16N	VW3 AE 0812	2.000	
		EXS5C20N...C31N	VW3 AE 0813	3.000	
		EXS5C40N...C63N	VW3 AE 0815	5.000	
Air condition	Without motor choke	EXS5D90N...C16N	VW3 AE 0919	56.000	
		EXS5C20N...C31N	VW3 AE 0920	71.000	
		EXS5C40N...C63N	VW3 AE 0921	86.000	
	With motor choke	EXS5D90N...C16N	VW3 AE 0922	71.000	
		EXS5C20N...C31N	VW3 AE 0923	71.000	
		EXS5C40N...C63N	VW3 AE 0924	86.000	

Inverters in standard enclosures for 690 V networks

The basic equipment contains:



- Frequency inverter ATV61 with integrated EMC filter
- Mains connection on main switch
- Main switch (without door handle)
- Superfast semiconductor fuses for inverter protection
- Line reactor
For ATV61EXA●●●Y the line reactor is available as option.
- LCD operating panel (mounted into the enclosure door)
- Terminals/bars for motor connection
- Control transformer for 400 V and 230 V to supply the cooling system as well as optional components.
- Protection degree IP23:
air inlet through the enclosure door, air outlet through the enclosure roof.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid in the enclosure door.
- Protection degree IP54:
air inlet through the enclosure door, air outlet through fan on the top.
At higher power the power part is cooled by an internal cooling circuit, the control part is cooled by fans in the enclosure door. Air flow through grid with filter in the enclosure door.
- Protection degree IP54 with separated air flow:
air flow through the plinth of the enclosure and mounted air guidance hood. Cooling of the control part by means of filter fans in the enclosure door.
- Inflow coolant temperature 0...40°C
(up to 50°C with derating)
- Enclosure Sarel S6000, color RAL 7032
- Multilingual operating instructions
- Documentation-CD-ROM with parameterization instructions, fieldbus instructions, operating and parameterizing software,...
- Enclosure layout plans consisting of circuit diagram, terminal connection table, list of materials and design drawing

Description

Altivar 61 Plus

ATV61EX●●●●●Y

Mains voltage 690 V

General technical data	
Input	
Voltage	690 V ±10% for TT, TN-C, TN-S or IT networks *)
Frequency	50 / 60 Hz ±5 % *)
Overvoltage class	Class III according to EN 50178
*) Technical data and remarks for mains voltages are given in chapter "Mains conditions", page 21.	
Output	
Control method	Vector-oriented flux control without feedback, V/f characteristic, energy saving system
Voltage	3 AC 0...100% mains voltage, dynamic voltage stabilization
Overload	20 % for 60 seconds per 10 minutes, 35 % for 2 seconds
Pulse frequency	2.5 kHz, adjustable from 2...4.9 kHz
Frequency / Base frequency	0.1...500 Hz / 25...500 Hz, adjustable
Short circuit protection	All-pole protected against short circuit and earth fault by means of overcurrent switch-off
Design	Floor-standing enclosure
Cooling	forced
Frequency resolution, digital	0.01 Hz / 50 Hz, frequency stability: ±0.01 % / 50 Hz
Speed accuracy	V/f mode: slip frequency VC without feedback 0.3 x slip frequency
Mechanical strength	
Mechanical vibration	According to IEC/EN 60068-2-6 1.5 mm at 3...10 Hz, 0.6 g at 10...200 Hz (3M3 according to IEC/EN 60721-3-3)
Shock	According to IEC/EN 60068-2-27 4 g for 11 ms (3M2 according to IEC/EN 60721-3-3)
Ambient conditions	
Operating temperature	0...+40°C (-10...+40°C with enclosure heating) 3K3 according to IEC/EN 60721-3-3 up to +50°C with derating
Storage / Transport temperature	-25...+70°C
Protection degree	selective: ATV61EXC2●●●Y ... IP23 ATV61EXC5●●●Y ... IP54 with air intake through filter mats ATV61EXS5●●●Y ... IP54 with separated air flow ATV61EXA2●●●Y ... IP23 with internal cooling circuit ATV61EXA5●●●Y ... IP54 with internal cooling circuit
Environmental class / Humidity	Class 3K3 in accordance with IEC/EN 60721-3-3 / no condensation, max. 95 % relative humidity
Altitude	Up to 1000 m, beyond power decrease of 1 % per 100 m up to 3000 m
Allowed pollution	Pollution degree: for IP23 design: pollution degree 2 according to EN 61800-5-1 for IP54 design: pollution degree 3 according to EN 61800-5-1 Chemical / mechanical classification: 3C2 and 3S2 according to EN 60721-3-3
Protection class	Class 1 according to EN 50178
Standards	
Basic standard	The devices are designed, built and tested on the basis of EN 50178.
EMC immunity	According to EN 61800-3, 1st and 2nd environment (IEC 1000-4-2; IEC 1000-4-3; IEC 1000-4-4; IEC 1000-4-5; IEC 1000-4-6)
EMC emission	In accordance with product standard EN 61800-3, 2nd environment, category C3
Insulation	Galvanic insulation in accordance with EN 50178 PELV (Protective Extra Low Voltage)
Standards	CE



Frequency inverters are a product of the restricted sales according to IEC 61800-3. In a residential environment this product can cause radio frequency interferences whereupon the user can be called on to take suitable measures.

Protection degree ATV61EXC● and ATV61EXS5

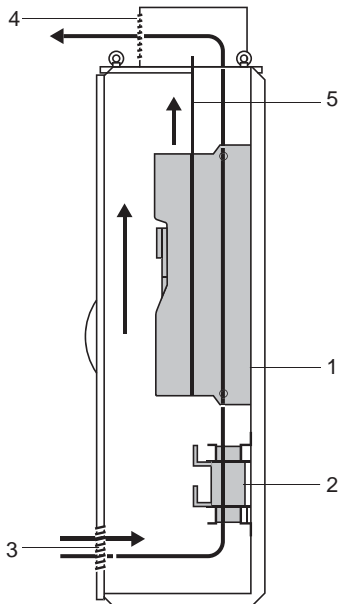
In order to adapt the utmost robust Altivar product line with enclosure design optimal to the individual requests of the system, these enclosure units are available in three different designs. Each solution contains a clearly specified and tested cooling system which provides highest operating safety.

The standard design of the ATV61 enclosure units complies with protection degree IP23. If a higher protection degree is desired or required, there are two IP54 solutions available.

- IP54 with filter mats
- IP54 with separated air flow

Overview of standardised protection degrees

ATV61EXC2 - Standard enclosure design IP23



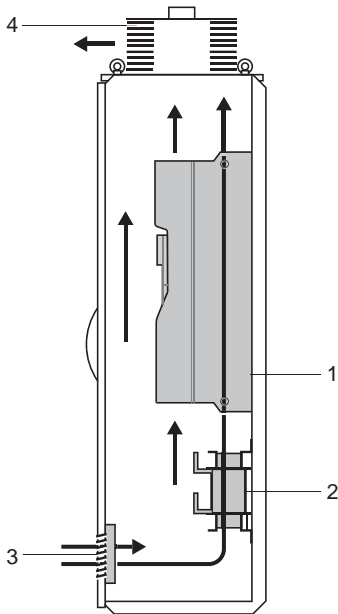
In this case the input of the cooling air takes place by the enclosure door and the output through the top of the enclosure. The air flow must not be constrained by means of fixtures or filter mats.

- 1 Frequency inverter ATV61
- 2 Line reactor
- 3 Air inlet grid (without filter mat) for control part and power part
- 4 Metal cover with splash water protection
- 5 Guided air flow to avoid internal air short-cuts

Protection degree: IP23

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV61EXC5 - Enclosure design IP54



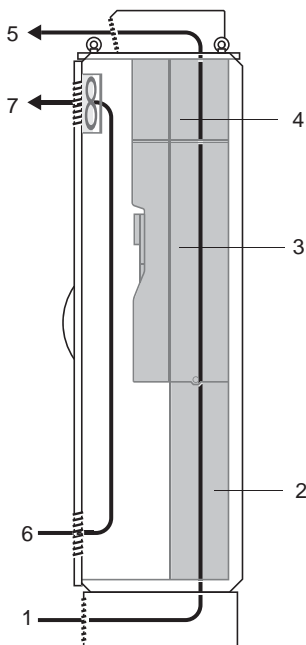
At protection degree IP54 with filter mats the input of the cooling air takes place through the filter mats in the enclosure door and the output through the fan at the top of the enclosure.

- 1 Frequency inverter ATV61
- 2 Line reactor
- 3 Air inlet grid (with filter mat)
- 4 Fan (with filter mat)

Protection degree: IP54

Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

ATV61EXS5 - Enclosure design IP54 with separated air flow



In case of protection degree IP54 with separate air channel the cooling air inlet for the power part takes place through the plinth and the air outlet through the enclosure roof. The control part is cooled by filter fans in the enclosure door or by an optional air condition.

- 1 Cooling air for power part (via enclosure plinth)
- 2 Air guidance channel
- 3 Frequency inverter ATV61
- 4 DC choke
(at ATV61EXS5●●●N and ATV61EXS5●●●Y instead of the DC choke a line reactor is delivered in a separate supply field)
- 5 Air outlet through metal grid with splash water protection
- 6 Air inlet (with filter mat) for control part
- 7 Air outlet (with filter fan) for control part

Protection degree: IP54

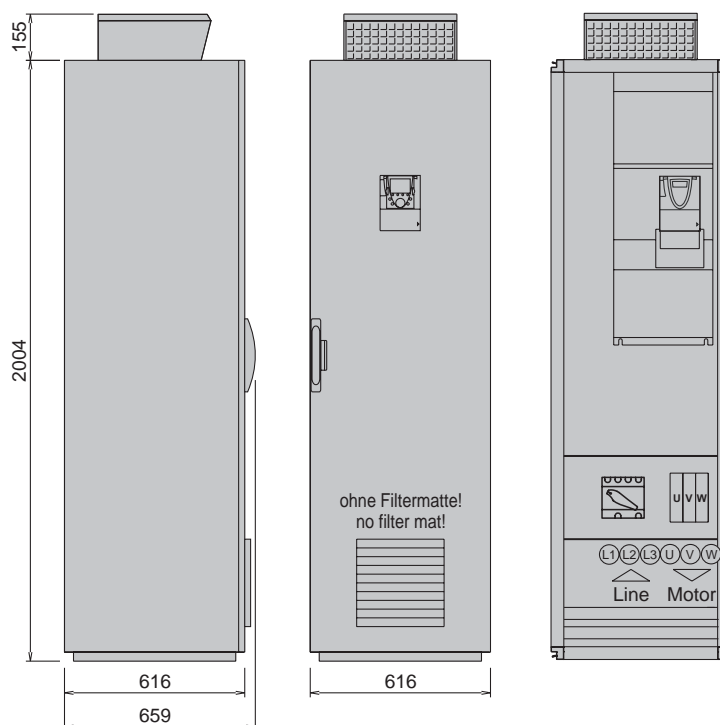
Air inlet temperature: 0...+40°C (-10...+40°C with enclosure heating)

Technical data ATV61EXC● and ATV61EXS5					
Type		ATV61EX●● C11Y	C13Y	C16Y	C20Y
Built-in standard device		ATV61HC11Y	ATV61HC13Y	ATV61HC16Y	ATV61HC20Y
Nominal data					
Motor rating					
P_N [kW]	$V_N = 690\text{ V}$	110	132	160	200
Continuous output current					
I_N [A]	$V_N = 690\text{ V}$	125	150	180	220
Maximum current for 60 s per 10 minutes					
I_{MAX} [A]	$V_N = 690\text{ V}$	150	180	216	264
Input					
Input current					
I_{IN} [A]	$V_N = 690\text{ V}$	117	137	163	199
Continuous apparent power					
S_N [kVA]	$V_N = 690\text{ V}$	140	164	195	238
Braking unit					
P_{CONT}/P_{MAX} [kW]		110/132	110/165	132/198	160/240
R_{MIN}/R_{MAX} [Ω]		4	4	4	4
Characteristics					
Efficiency [%]		97.5	97.5	97.6	97.6
Losses [W]	at I_N	2740	3230	3900	4760
Weight net/gross [kg]					
ATV61EXC2●●●Y		320/360	320/360	370/410	370/410
ATV61EXC5●●●Y		330/370	330/370	380/420	380/420
ATV61EXS5●●●Y		395/445	395/445	445/495	445/495
Ambient conditions					
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	600 / 600 / 600	600 / 600 / 600	600 / 600 / 600	600 / 600 / 600
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	64 / 65 / 64	64 / 65 / 64	64 / 65 / 64	64 / 65 / 64
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 100	100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version

ATV61EXC2C11Y ... C20Y



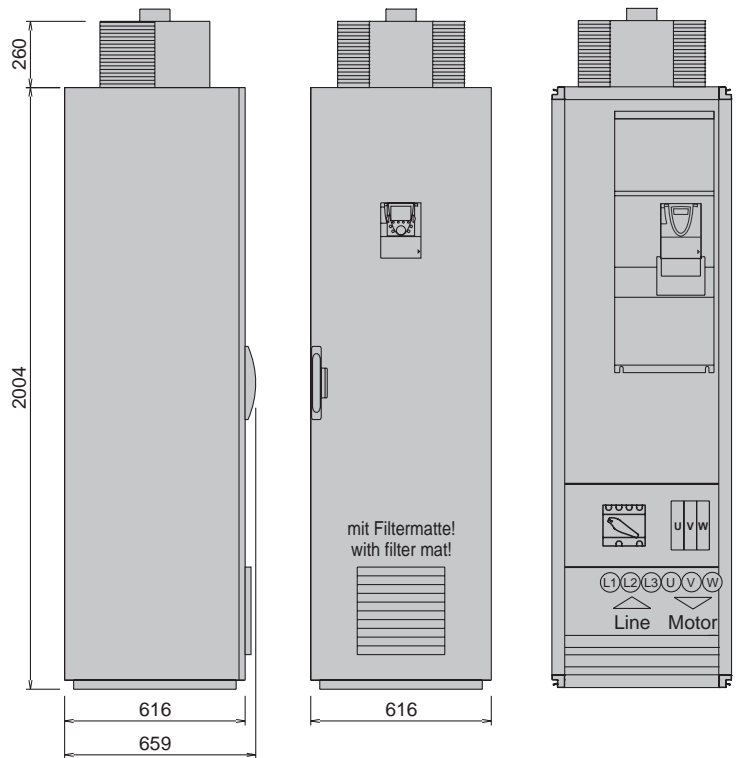
Altivar 61 Plus

ATV61EX●●●●●Y

Mains voltage 690 V

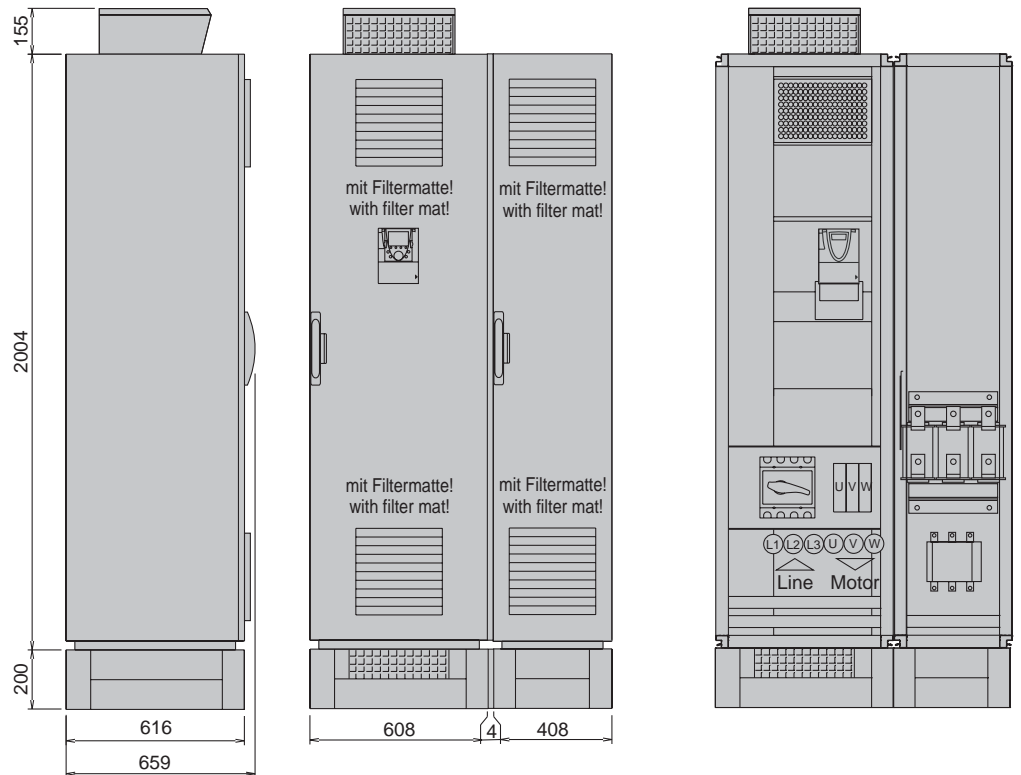
Dimensions: IP54CV Compact version

ATV61EXC5C11Y ... C20Y



Dimensions: IP54SA with separated air flow

ATV61EXS5C11Y ... C20Y



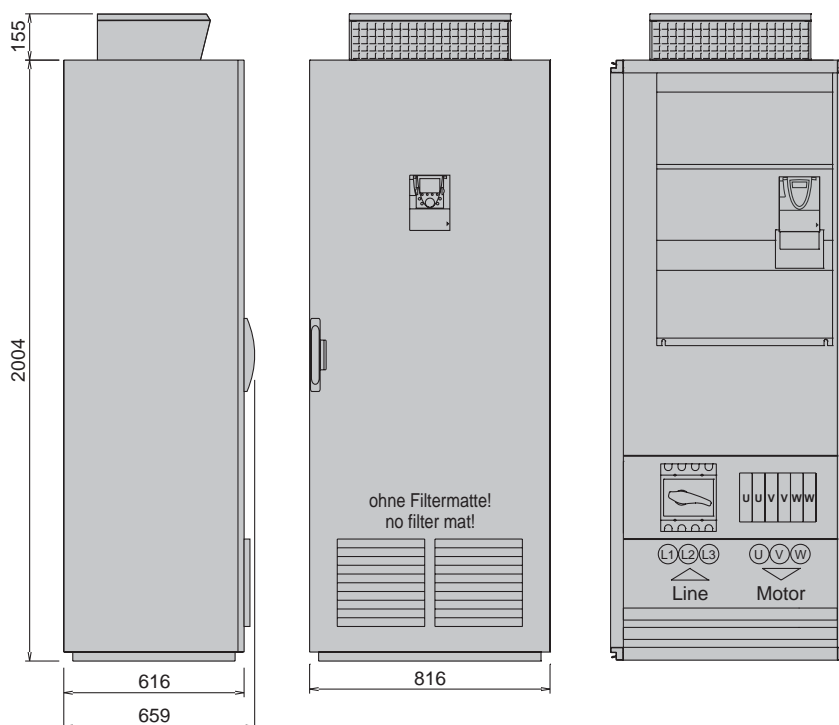
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV61EX●●		
	C25Y	C31Y	C40Y
Built-in standard device	ATV61HC25Y	ATV61HC31Y	ATV61HC40Y
Nominal data			
Motor rating			
P_N [kW]	$V_N = 690\text{ V}$ 250	315	400
Continuous output current			
I_N [A]	$V_N = 690\text{ V}$ 290	355	420
Maximum current for 60 s per 10 minutes			
I_{MAX} [A]	$V_N = 690\text{ V}$ 348	426	504
Input			
Input current			
I_{IN} [A]	$V_N = 690\text{ V}$ 257	317	394
Continuous apparent power			
S_N [kV]	$V_N = 690\text{ V}$ 307	379	471
Braking unit			
P_{CONT}/P_{MAX} [kW]	200/300	250/375	315/473
R_{MIN}/R_{MAX} [Ω]	2	2	2
Characteristics			
Efficiency [%]	97.7	97.7	97.7
Losses [W]	at I_N 5920	7330	8850
Weight net/gross [kg]			
ATV61EXC2●●●Y	455/500	505/550	505/550
ATV61EXC5●●●Y	455/500	505/550	505/550
ATV61EXS5●●●Y	515/570	565/620	565/620
Ambient conditions			
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5 1200 / 1200 / 1200	1200 / 1200 / 1200	1200 / 1200 / 1200
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5 66 / 68 / 72	66 / 68 / 72	66 / 68 / 72
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5 100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

Dimensions: IP23CV Compact version

ATV61EXC2C25Y ... C40Y



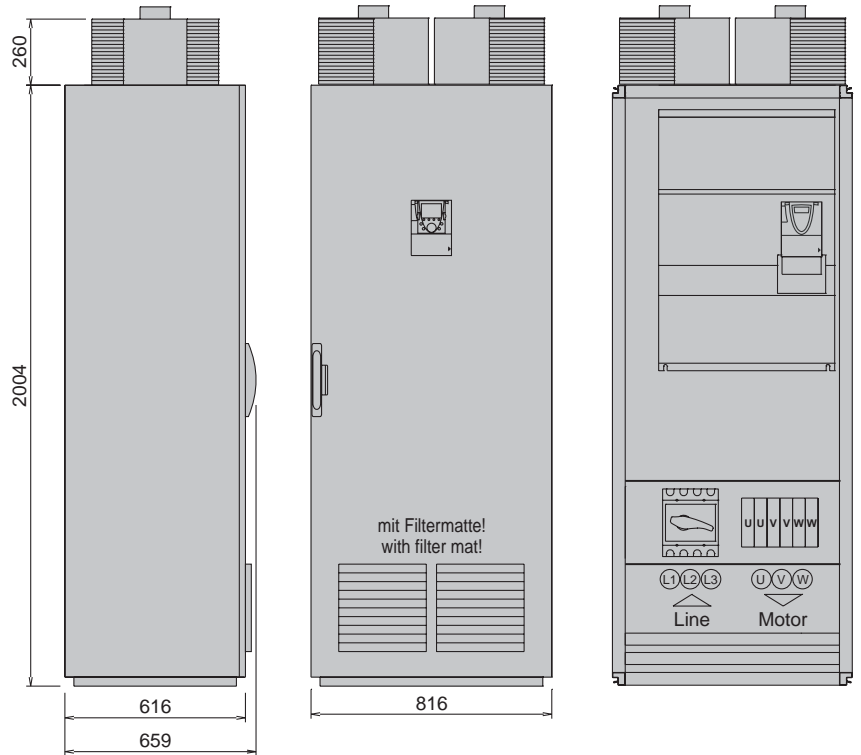
Altivar 61 Plus

ATV61EX●●●●●Y

Mains voltage 690 V

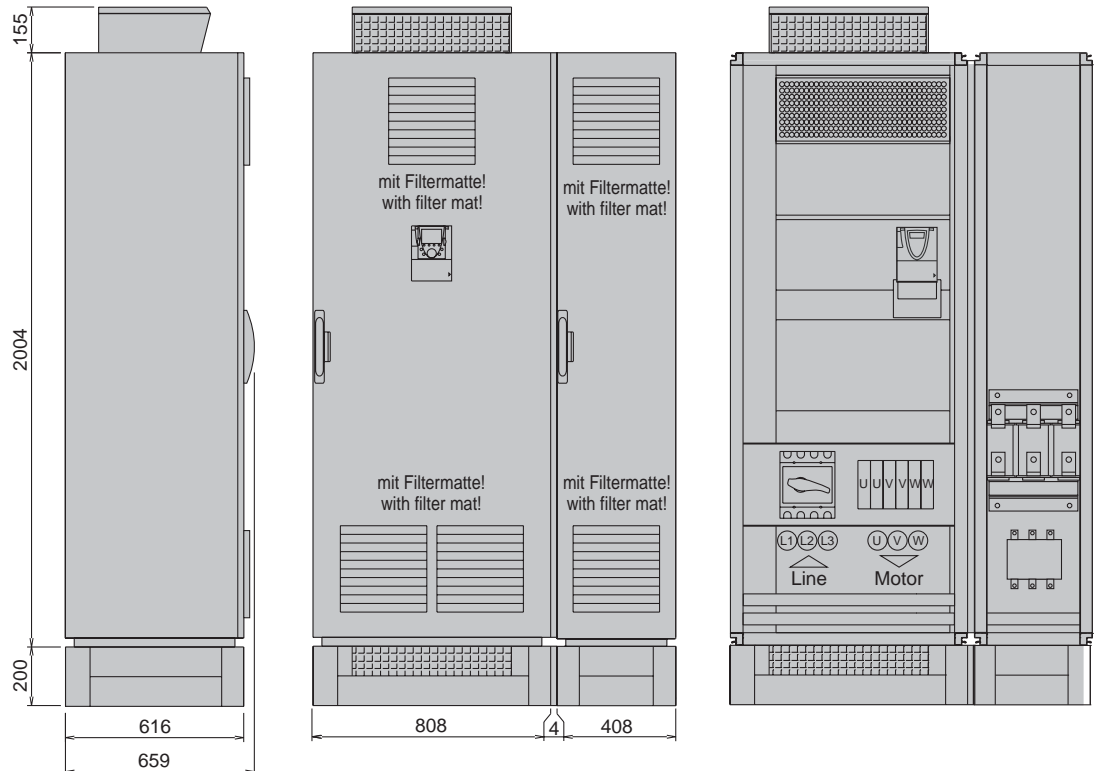
Dimensions: IP54CV Compact version

ATV61EXC5C25Y ... C40Y



Dimensions: IP54SA with separated air flow

ATV61EXS5C25Y ... C40Y



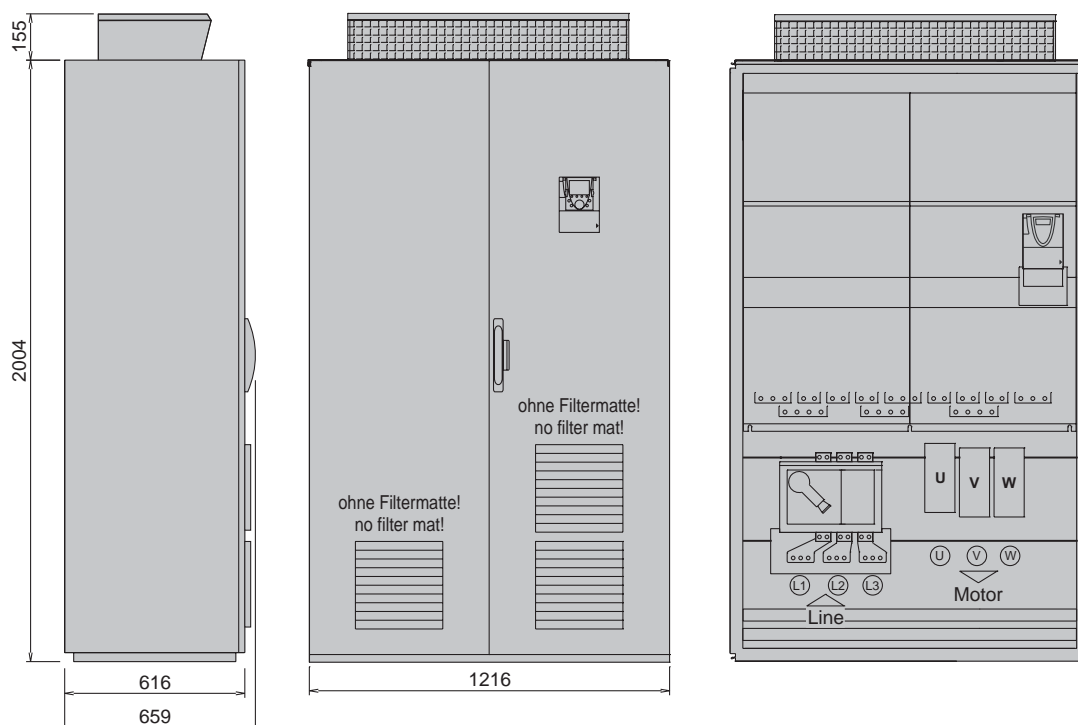
The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV61EX●●			
	C50Y	C63Y	C80Y	
Built-in standard device	ATV61HC50Y	ATV61HC63Y	ATV61HC80Y	
Nominal data				
Motor rating				
P_N [kW]	$V_N = 690\text{ V}$	500	630	800
Continuous output current				
I_N [A]	$V_N = 690\text{ V}$	543	675	840
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 690\text{ V}$	652	810	1008
Input				
Input current				
I_{IN} [A]	$V_N = 690\text{ V}$	505	616	775
Continuous output power				
S_N [kW]	$V_N = 690\text{ V}$	604	736	926
Braking unit				
P_{CONT}/P_{MAX} [kW]		400/600	500/750	630/945
R_{MIN}/R_{MAX} [Ω]		1	1	1
Characteristics				
Efficiency [%]		97.8	97.8	97.8
Losses [W]	at I_N	11220	13990	17570
Weight net/gross [kg]				
ATV61EXC2●●●Y		770/825	860/915	860/915
ATV61EXC5●●●Y		800/855	890/945	890/945
ATV61EXS5●●●Y		845/910	935/1000	935/1000
Ambient conditions				
Volume of cooling air [m ³ /h]	EXC2 / EXC5 / EXS5	2400 / 2400 / 2400	2400 / 2400 / 2400	2400 / 2400 / 2400
Sound pressure level [dB(A)]	EXC2 / EXC5 / EXS5	69 / 79 / 73	69 / 79 / 73	69 / 79 / 73
Mains short circuit current [kA] *)	EXC2 / EXC5 / EXS5	100 / 100 / 100	100 / 100 / 100	100 / 100 / 100

*) ... Values valid only in combination with pre-fuses, see chapter "Fuses and cable cross sections".

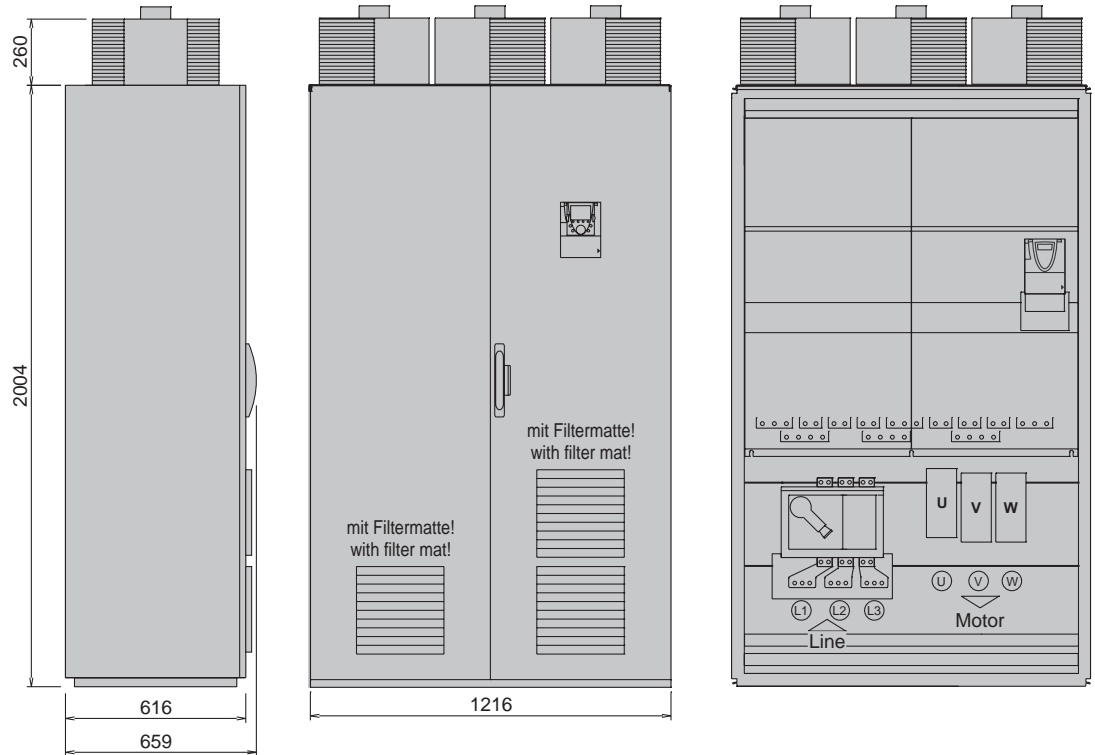
Dimensions: IP23CV Compact version

ATV61EXC2C50Y ... C80Y



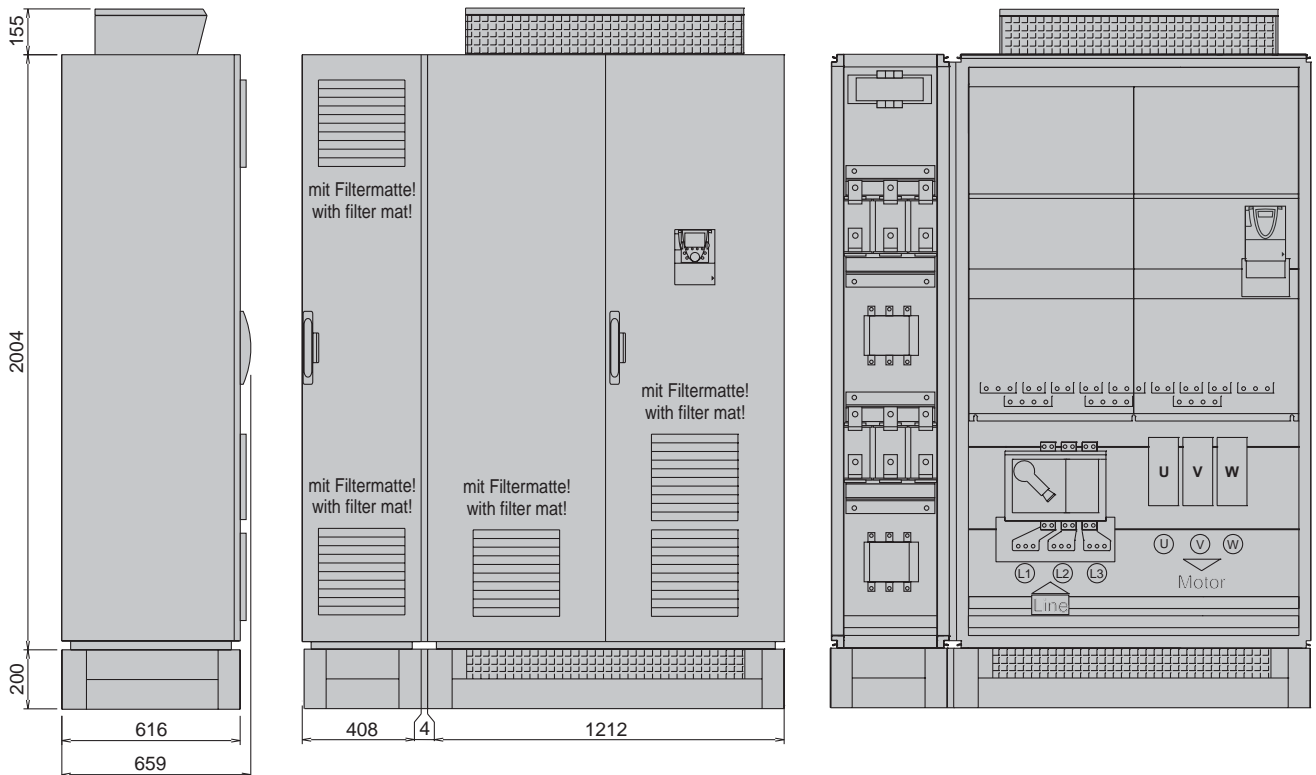
Dimensions: IP54CV Compact version

ATV61EXC2C50Y ... C80Y



Dimensions: IP54SA with separated air flow

ATV61EXC2C50Y ... C80Y

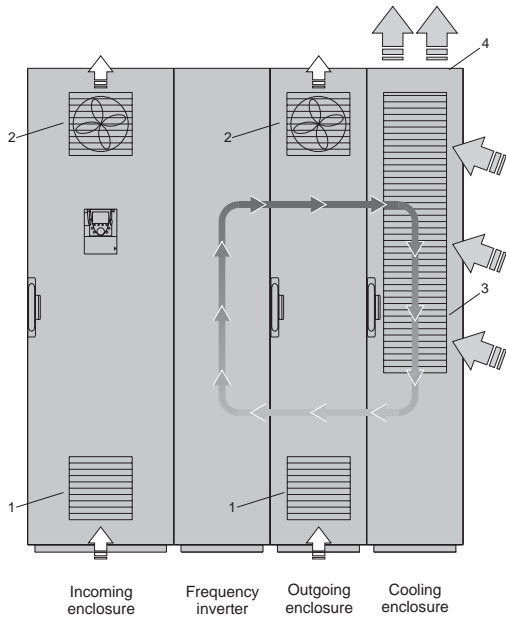


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Protection degree ATV61EXA●

Overview of available protection degrees

ATV61EXA2 - Enclosure design IP23 with internal cooling circuit



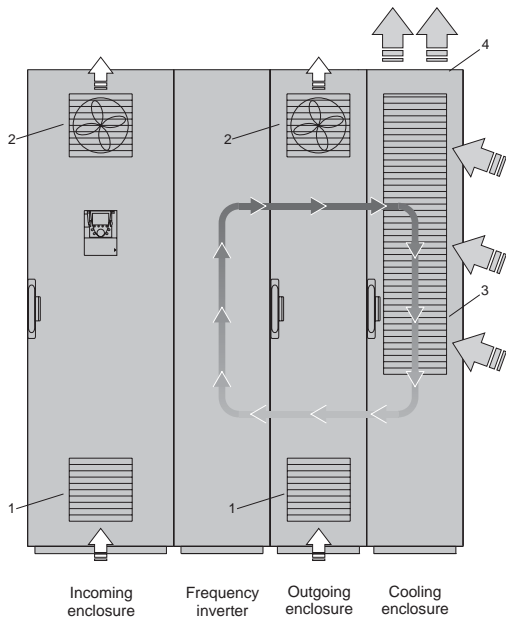
In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by fans in the enclosure door.

- 1 Air inlet grid
- 2 Air outlet with fans
- 3 Air inlet grid with fans for power part
- 4 Air outlet grid for power part

Protection degree: IP23

Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

ATV61EXA5 - Enclosure design IP54 with internal cooling circuit



In case of this enclosure design the cooling of the power part takes place in an own enclosure. Here the cooling air is sucked in by the fans in the enclosure door and the air outlet takes place through the enclosure roof. The control part is cooled by filter fans in the enclosure door.

- 1 Air inlet grid with filter mats
- 2 Air outlet with filter fans
- 3 Air inlet grid with fans for power part
- 4 Air outlet grid for power part

Protection degree: IP54

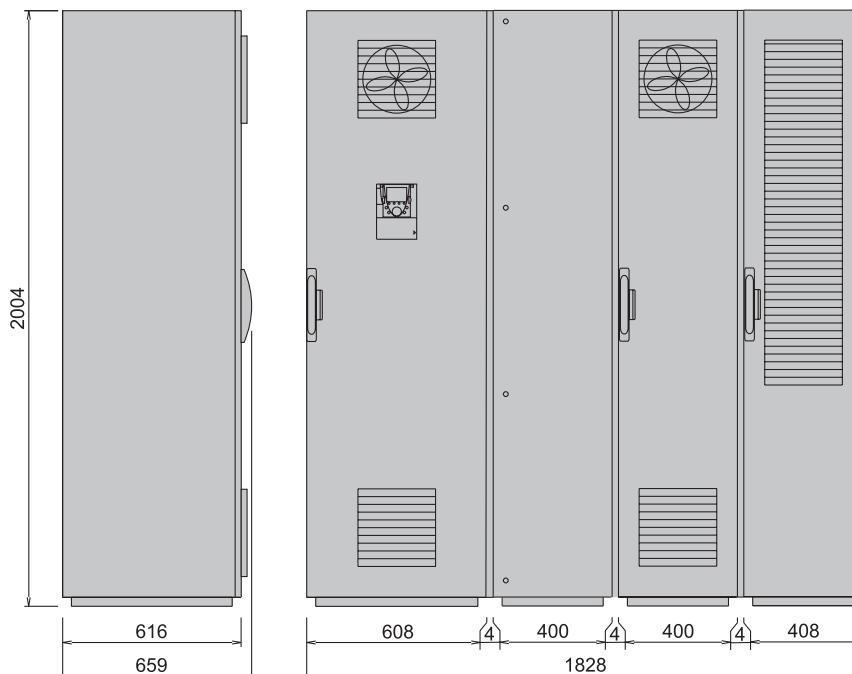
Air inlet temperature: 0...+40°C
(-10...+40°C with enclosure heating)

Technical data ATV61EXA●				
Type		ATV61EXA● C80Y	M10Y	M12Y
Internal inverter unit		ATV61EC80YE1	ATV61EM10YE1	ATV61EM12YE1
Nominal data				
Motor rating				
P_N [kW]	$V_N = 690\text{ V}$	800	1000	1200
Continuous output current				
I_N [A]	$V_N = 690\text{ V}$	840	1050	1230
Maximum current for 60 s per 10 minutes				
I_{MAX} [A]	$V_N = 690\text{ V}$	1008	1260	1476
Input				
Input current				
I_{IN} [A]	$V_N = 690\text{ V}$	810	1023	1203
S_N [kVA]	$V_N = 690\text{ V}$	968	1223	1438
Characteristics				
Efficiency [%]		> 98.0	> 98.0	> 98.0
Losses [kW]	at I_N	15.8	19.6	23.4
Weight net/gross [kg]		900/950	900/950	900/950
Ambient conditions				
Volume of cooling air [m ³ /h]		5500	5500	5500
Sound pressure level [dB(A)]		77	77	77
Mains short circuit current [kA] *)		100	100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions:

ATV61EXA●C80Y, M10Y, M12Y

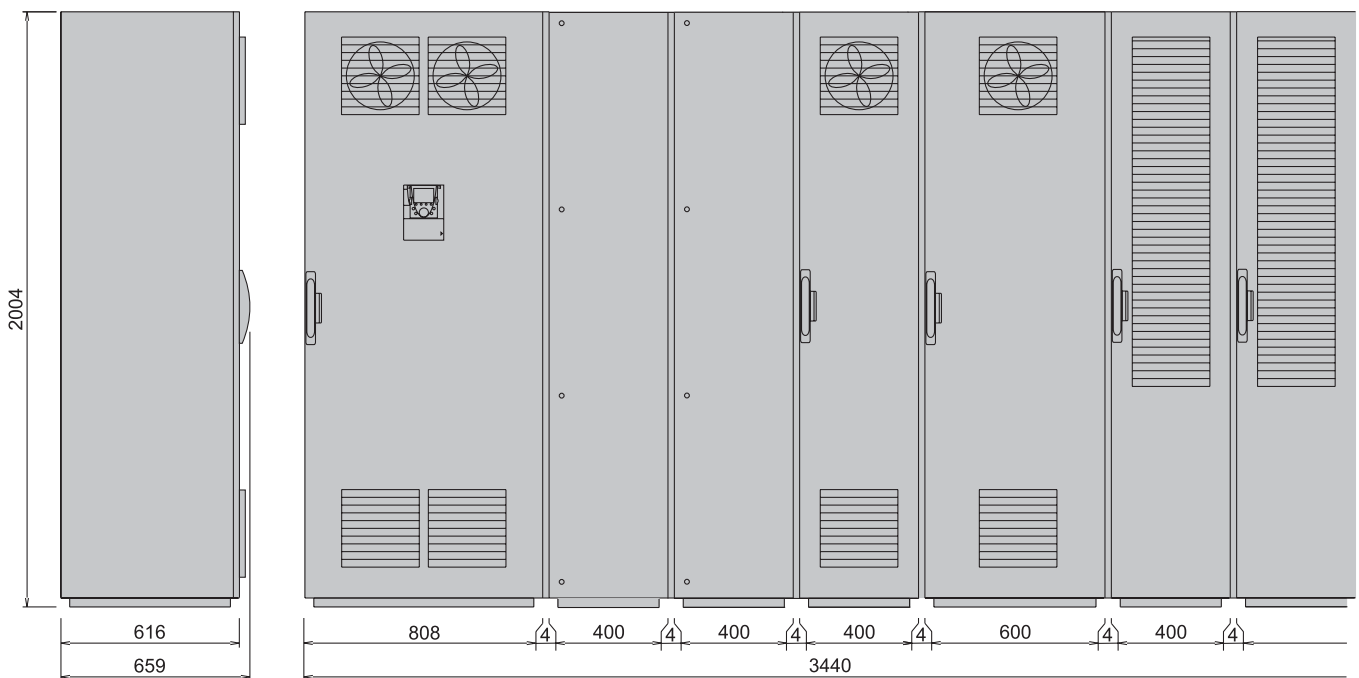


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

Type	ATV61EXA●				
	M15Y	M18Y	M21Y	M24Y	
Internal inverter unit	ATV61EM15YE1	ATV61EM18YE1	ATV61EM21YE1	ATV61EM24YE1	
Nominal data					
Motor rating					
P_N [kW]	$V_N = 690$ V	1500	1800	2100	2400
Continuous output current					
I_N [A]	$V_N = 690$ V	1580	1860	2140	2430
Maximum current for 60 s per 10 minutes					
I_{MAX} [A]	$V_N = 690$ V	1896	2232	2568	2916
Input					
Input current					
I_{IN} [A]	$V_N = 690$ V	1483	1793	2065	2336
Continuous apparent power					
S_N [kVA]	$V_N = 690$ V	1772	2143	2468	2792
Characteristics					
Efficiency [%]		> 98.0	> 98.0	> 98.0	> 98.0
Losses [kW]	at I_N	29.5	35.0	40.5	46.5
Weight net/gross [kg]		1850/1925	1850/1925	1850/1925	1850/1925
Ambient conditions					
Volume of cooling air [m ³ /h]		11000	11000	11000	11000
Sound pressure level [dB(A)]		79	79	79	79
Mains short circuit current [kA *)		100	100	100	100

*) ... Values valid only in combination with pre-fuses and line reactor, see chapter "Fuses and cable cross sections".

Dimensions: ATV61EXA●M15Y, M18Y, M21Y, M24Y

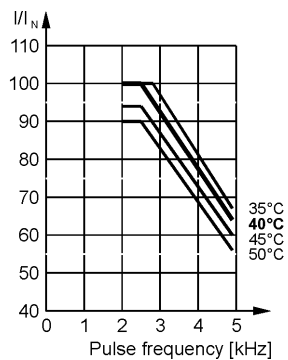


The total dimensions of the cubicles including options are given in chapter "Width of the cubicle", page 179.

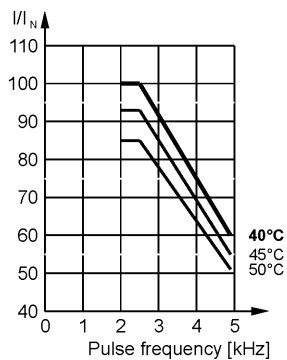
Power decrease

Depending on the chosen pulse frequency and the maximum ambient temperature a power increase is possible or a power reduction is necessary. This can be determined by means of the following diagrams.

ATV 61EX●●C11Y ... EX●●C80Y



ATV 61EXA●C80Y ... EXA●M24Y



Please observe the following guidelines to guarantee trouble-free operation of the drive:

- At higher pulse frequencies the allowed motor cable length is reduced (see chapter "Motor cable lengths").
- Select a motor that is at most one type bigger.



If the heat sink temperature is too high, the pulse frequency is automatically reduced to prevent an overload of the inverter.

Fuses and cable cross sections

The Altivar enclosure designs have input fuses built-in as standard. These fuses are for the case that the electronic protective mechanism of the inverter fails. So they are a secondary protection of the inverter to protect the power cables against overload and to protect the input rectifier against an internal short-circuit.

The below-mentioned diameters for 3-wire cables are recommended values for laying the cable in air at max. 40°C ambient temperature, based on the regulations ÖVN EN 1 and VDE 0100.

The lines in the enclosure are dimensioned according to the specification for single conductors XLPE/EPR copper 90°C.

The motor cables are dimensioned for the maximum continuous current. They apply to 0...100 Hz (up to 300 Hz the cable losses increase about 25 % because of the Skin-effect).



In case of other ambient conditions and different regulations the cable diameters must be adjusted.



If the mains fuses blow the inverter already has a primary defect. Therefore, exchanging the blown fuses and switching the inverter on again is not effective. Consequently, the use of circuit breakers is not advantageous and has additionally the disadvantage of a slower switch-off.



A low cost alternative to screened motor cables is the use of NYCY or NYCWY cables (power cables with concentric protective conductor).



The dimensioning of the pre-fuses, mains cable cross sections and mains cable length has to be done taking into account the available mains short circuit current to ensure a safe switch-off in case of a fault!

If required increase the power of the transformer to reach the necessary short circuit capability.

Cable cross sections at standard design									
		Mains supply				Internal fuse (per phase)	Motor output		
		No. of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)		Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV61EX●● (6-pulse)	C11Y	3	160A	1x (3x 70)	2x 120 (M8)	160 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 70)
	C13Y	3	200A	1x (3x 95)	2x 120 (M8)	200 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 70)
	C16Y	3	250A	1x (3x 120)	2x 185 (M12)	250 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 95)
	C20Y	3	315A	1x (3x 185)	2x 185 (M12)	315 A sf	2x 150 (M10)	2x 150 (M10) or 4x 240 (M12) ¹⁾	1x (3x 120)
	C25Y	3	400A	2x (3x 120)	2x 150 (M10)	400 A sf	4x 240 (M12)	4x 240 (M12)	1x (3x 185)
	C31Y	3	500A	2x (3x 150)	2x 150 (M10)	500 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 120)
	C40Y	3	630A	2x (3x 185)	3x 185 (M12)	630 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C50Y	3	800A	3x (3x 185)	4x 300 (M12)	2x 400 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
	C63Y	3	1000A	4x (3x 185)	4x 300 (M12)	2x 500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
	C80Y	3	1250A	4x (3x 240)	4x 300 (M12)	2x 630 A sf	4x 240 (M12)	4x 240 (M12)	4x (3x 185)
ATV61EXA● (6-pulse)	C80Y	3	1250A	6x (3x 150) or 4x (3x 240)	10x 240 (M12)	2x 630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	M10Y	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	M12Y	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M15Y	3	2000A	8x (3x 185)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M18Y	3	2500A	12x (3x 150) or 8x (3x 240)	16x 240 (M12)	4x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M21Y	3	3200A	12x (3x 185)	16x 240 (M12)	4x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M24Y	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)
ATV61EXA● (12-pulse)	C80Y	6	630A	2x [3x (3x 150)] or 2x [2x (3x 240)]	4x 240 (M12)	630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	M10Y	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	M12Y	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M15Y	6	1000A	2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M18Y	6	1250A	2x [6x (3x 150)] or 2x [4x (3x 240)]	8x 240 (M12)	2x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M21Y	6	1600A	2x [6x (3x 185)]	8x 240 (M12)	2x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M24Y	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)

1)at IP54 with separated air flow (ATV61EXS5●●●Y)



Differing cable cross sections on request.

Cable cross sections at cable entry via the top									
		Mains supply				Internal fuse (per phase)	Motor output		
		No. of phases	Pre-fuse (per phase)	Recommended cable [mm ²]	Max. cable [mm ²] (per phase)		Max. cable (without motor choke) [mm ²] (per phase)	Max. cable (with motor choke) [mm ²] (per phase)	Recommended cable [mm ²]
ATV61EX●● (6-pulse)	C11Y	3	160A	1x (3x 70)	2x 150 (M10)	160 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 70)
	C13Y	3	200A	1x (3x 95)	2x 150 (M10)	200 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 70)
	C16Y	3	250A	1x (3x 120)	2x 150 (M10)	250 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 95)
	C20Y	3	315A	1x (3x 185)	2x 240 (M12)	315 A sf	2x 150 (M10)	2x 150 (M10)	1x (3x 120)
	C25Y	3	400A	2x (3x 120)	4x 240 (M12)	400 A sf	4x 240 (M12)	4x 240 (M12)	1x (3x 185)
	C31Y	3	500A	2x (3x 150)	4x 240 (M12)	500 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 120)
	C40Y	3	630A	2x (3x 185)	4x 240 (M12)	630 A sf	4x 240 (M12)	4x 240 (M12)	2x (3x 150)
	C50Y	3	800A	3x (3x 185)	4x 240 (M12)	2x 400 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 150)
	C63Y	3	1000A	4x (3x 185)	4x 240 (M12)	2x 500 A sf	4x 240 (M12)	4x 240 (M12)	3x (3x 185)
C80Y	3	1250A	4x (3x 240)	4x 240 (M12)	2x 630 A sf	4x 240 (M12)	4x 240 (M12)	4x (3x 185)	
ATV61EXA● (6-pulse)	C80Y	3	1250A	6x (3x 150) or 4x (3x 240)	10x 240 (M12)	2x 630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	M10Y	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	M12Y	3	1600A	8x (3x 150) or 6x (3x 240)	10x 240 (M12)	2x 900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M15Y	3	2000A	8x (3x 185)	16x 240 (M12)	4x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M18Y	3	2500A	12x (3x 150) or 8x (3x 240)	16x 240 (M12)	4x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M21Y	3	3200A	12x (3x 185)	16x 240 (M12)	4x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M24Y	3	3200A	16x (3x 150) or 12x (3x 240)	16x 240 (M12)	4x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)
ATV61EXA● (12-pulse)	C80Y	6	630A	2x [3x (3x 150)] or 2x [2x (3x 240)]	4x 240 (M12)	630 A sf	16x 240 (M12)	16x 240 (M12)	4x (3x 185) or 3x (3x 240)
	M10Y	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	800 A sf	16x 240 (M12)	16x 240 (M12)	5x (3x 185) or 4x (3x 240)
	M12Y	6	800A	2x [4x (3x 150)] or 2x [3x (3x 240)]	4x 240 (M12)	900 A sf	16x 240 (M12)	16x 240 (M12)	6x (3x 185) or 5x (3x 240)
	M15Y	6	1000A	2x [4x (3x 185)]	8x 240 (M12)	2x 500 A sf	24x 240 (M12)	24x 240 (M12)	7x (3x 185) or 6x (3x 240)
	M18Y	6	1250A	2x [6x (3x 150)] or 2x [4x (3x 240)]	8x 240 (M12)	2x 630 A sf	24x 240 (M12)	24x 240 (M12)	9x (3x 185) or 7x (3x 240)
	M21Y	6	1600A	2x [6x (3x 185)]	8x 240 (M12)	2x 800 A sf	24x 240 (M12)	24x 240 (M12)	10x (3x 185) or 8x (3x 240)
	M24Y	6	1600A	2x [8x (3x 150)] or 2x [6x (3x 240)]	8x 240 (M12)	2x 900 A sf	24x 240 (M12)	24x 240 (M12)	11x (3x 185) or 9x (3x 240)



Differing cable cross sections on request.

Motor cable lengths

Because of the permitted mains disturbances, the allowed overvoltages at the motor, the occurring bearing currents and the permitted losses the distance between inverter and motor(s) is limited. The maximum distance heavily depends on the type of motor cable (screened/unscreened) as well as from the used options.

Overvoltages at the motor

Overvoltages at the motor terminals result from reflection in the motor cable. Basically the motors are stressed with measurable higher voltage peaks from a motor cable length of 50 m. Thereby the motor load is nearly independent from the used inverter !

Line supply voltage 690 V Motor insulation for 2000 V phase-to-phase peak voltage and dv/dt resistance > 8 kV/μs

In order to use standard motors in this voltage range, the Altivar frequency inverters have a function to inhibit short output voltage pulses. With this function the reflection conditional overvoltages are attenuated. The slew rate as well as the EMC load are not influenced by changing this parameter.

At even longer motor cables the use of a "dv/dt filter" is required. Combined with the cable capacitance the option motor choke affects like a filter and limits the voltage peaks at the motor as well as the slew rate of the output pulses.

When the specified motor cable lengths are observed the motor life time can be significantly extended.

Line supply voltage 690 V max. 1800 V phase-to-phase peak voltage and dv/dt < 1000 V/μs



Observing the specified length of motor cables is absolutely necessary to protect the motor !

EMC interferences

The mains rectifier as well as the IGBT inverter cause high-frequent interferences which drain off more and more stronger to the earth potential with increasing motor cable length. As a result the line-conducted interferences to the mains increase. The attenuation of the line reactors is not longer sufficient and the permitted interference limits are exceeded.



Observing the specified length of motor cables is also necessary for compliance with the EMC limits !

Bearing currents

Common mode bearing currents which even cannot be prevented by means of motors equipped with an insulated bearing are significantly reduced by use of the option motor choke.

Especially in case of big motors with middle up to high motor cable lengths the option motor choke is considerable to increase the availability of the motor.

Multiplication factors



The specified lengths of motor cables are recommended limits based on typical motor cables, laying in cable channels, default pulse frequency and maximal output frequency of 100 Hz.

In case of different conditions the recommended cable lengths must be converted by means of the following factors.

If several factors apply, please multiply them.

- The pulse frequency does not correspond to factory default:

at 4 kHz multiply all values by 0.7

- In case of output frequencies higher than 100 Hz:

up to 200 Hz multiply all values by 0.8

up to 300 Hz multiply all values by 0.5

- Instead of two parallel cables one thicker cable is used: multiply all values by 1.5

- In case of 6-pole motor cabling (e.g. for star/delta starting circuit): multiply all values by 0.75

- In case of parallel motors with their centre near the inverter values must be converted in compliance with the number of motors. When an adjusted motor choke is used for each motor, the following values in brackets apply.

at 2 motors multiply all values by 0.40 (0.80)

at 3 motors multiply all values by 0.25 (0.60)

at 4 motors multiply all values by 0.15 (0.40)

at 5 motors multiply all values by 0.10 (0.25)

- If the centre of the parallel motors is near the motors, following factors for conversion apply:

at 2 motors multiply all values by 0.80

at 3 motors multiply all values by 0.60

at 4 motors multiply all values by 0.40

at 5 motors multiply all values by 0.25

Recommended maximum lengths of motor cables in 2nd environment (industrial environment)

C3 (EN 55011 - class A group 2)

no option	15 m	screened cable
with motor choke	50 m	screened cable

C4 (EMC concept)

with motor choke	150 m	screened cable
no option	30 m	unscreened cable
with motor choke	250 m	unscreened cable

Available options

To enlarge the field of applications, various options are available concerning control and operation, extensions referring to the electric arrangement and to increase the protection degree.

General enclosure options

Allocation table for options

Option	Brief description	Order number	Weight [kg]	Reference
Inputs/outputs				
Basic I/O extension card	Terminal extension for additional digital inputs and outputs	VW3 A3E 201	0.320	See product catalogue
Extended I/O extension card	Terminal extension for additional analog and digital inputs and outputs	VW3 A3E 202	0.300	See product catalogue
Control terminals X12	Control terminals for the basic inverter	VW3 AE 1201	0.700	Page 145
Control terminals X12, X13	Control terminals for the basic device and the I/O option cards VW3 A3E 201 and 202.	VW3 AE 1202	0.900	Page 145
Adapter for 115 V logic inputs	Enables the use of 115 V logic signals.	VW3 A3E 101	0.200	See product catalogue
Relay output OC	Relay for digital output (Open collector)	VW3 AE 2201	0.100	Page 146
Multi-pump card	Allows the adaptation to pump applications.	VW3 A3E 502	0.320	See product catalogue
Extended multi-pump card	This card supports all multi-pump applications.	VW3 A3E 503	0.320	See product catalogue
"Controller inside" card	Programmable card for integration of control system functions.	VW3 A3E 501	0.300	See product catalogue
Additional electrical input isolation	Isolated amplifier with optoelectronic potential separation connected to the analog input of the inverter	VW3 AE 1901	0.100	Page 147
Isolated amplifier (output)	Isolated amplifier with optoelectronic potential separation connected to the analog output of the inverter	VW3 AE 1902	0.100	Page 148
Encoder feedback				
Encoder interface card 5 V / RS422	Extension card for encoder feedback. Supply voltage 5 V / RS422	VW3 A3E 401	0.200	See product catalogue
Encoder interface card 12 V OC	Extension card for encoder feedback. Supply voltage 12 V / open collector output	VW3 A3E 403	0.200	
Encoder interface card 15 V OC	Extension card for encoder feedback. Supply voltage 15 V / open collector output	VW3 A3E 404	0.200	
Encoder interface card 12 V (push-pull)	Extension card for encoder feedback. Supply voltage 12 V / push-pull	VW3 A3E 405	0.200	
Encoder interface card 15 V (push-pull)	Extension card for encoder feedback. Supply voltage 15 V / push-pull	VW3 A3E 406	0.200	
Encoder interface card 24 V (push-pull)	Extension card for encoder feedback. Supply voltage 24 V / push-pull	VW3 A3E 407	0.200	
Fieldbuses (buildings)				
LonWorks communication card	Option card for control of the inverter via LonWorks.	VW3 A3E 312	0.300	See product catalogue
METASYS N2 communication card	Option card for control of the inverter via METASYS N2.	VW3 A3E 313	0.300	
APOGEE FLN communication card	Option card for control of the inverter via APOGEE FLN.	VW3 A3E 314	0.300	
BACnet communication card	Option card for control of the inverter via BACnet.	VW3 A3E 315	0.300	

Allocation table for options				
Option	Brief description	Order number	Weight [kg]	Reference
Fieldbuses (industry)				
Modbus TCP/IP communication card	Option card for control of the inverter via Modbus TCP/IP.	VW3 A3E 310	0.300	
Modbus TCP/IP Daisy Chain communication card	Option card for control of the inverter via Modbus TCP/IP Daisy Chain.	VW3 A3E 310d	0.300	
Ethernet/IP communication card	Option card for control of the inverter via Ethernet/IP.	VW3 A3E 316	0.300	
Fipio communication card	Option card for control of the inverter via Fipio.	VW3 A3E 311	0.300	
Modbus Plus communication card	Option card for control of the inverter via Modbus plus.	VW3 A3E 302	0.300	
DeviceNet communication card	Option card for control of the inverter via DeviceNet.	VW3 A3E 309	0.300	
Interbus communication card	Option card for control of the inverter via Interbus.	VW3 A3E 304	0.300	
CC-Link communication card	Option card for control of the inverter via CC-Link.	VW3 A3E 317	0.300	
Modbus/Uni-Telway communication card	Option card for control of the inverter via Modbus/Uni-Telway.	VW3 A3E 303	0.300	
Profibus DP communication card	Option card for control of the inverter via Profibus DP.	VW3 A3E 307	0.300	
Profibus DPv1 communication card	Option card for control of the inverter via Profibus DPv1.	VW3 A3E 307 S371	0.300	
Safety - monitoring of the motor				
Safe standstill with button		VW3 AE 1501	0.100	Page 152
Safe standstill with relay	This function prevents any unintended start-up of the motor and guarantees the safety of the machine and plant personnel.	VW3 AE 1502	0.100	Page 152
Safe standstill with relay (delayed)		VW3 AE 1503	0.100	Page 152
PTC-relay	PTC thermistor relay to monitor the PTC thermistors in the motor	VW3 AE 2001	0.100	Page 149
PTC-relay with PTB certificate	PTC thermistor relay with PTB certificate to monitor the PTC thermistors in the motor in EX-environments	VW3 AE 2002	0.100	Page 150
Pt100 relay for motor winding	Pt100 relay to monitor the Pt100 sensors in the motor winding	VW3 AE 2003	0.300	Page 150
Pt100 relay for motor bearings	Pt100 relay to monitor the Pt100 sensors in the motor bearings	VW3 AE 2004	0.300	Page 150
Pt100 relay for transformer	Pt100 relay to monitor the Pt100 sensors in the transformer	VW3 AE 2005	0.300	Page 150
Further enclosure options				
Insulation monitoring	Monitors each phase to earth fault (only for IT networks)	VW3 AE 2601	5.000	Page 155
Design for IT networks	The frequency inverter will be prepared for the connection to non-grounded networks (IT networks).	VW3 AE 2701	–	Page 155
External 230V AC supply terminals	Provides the terminals and the protection for an external 230 V supply voltage.	VW3 AE 1301	0.100	Page 156
Buffer voltage 24 V DC power supply	24 V DC power supply with fuse protection.	VW3 AE 1401	2.200	Page 157
External 24 V DC supply terminals	Provides the terminals and the protection for an external 24 V buffer voltage.	VW3 AE 1402	0.100	Page 157
Enclosure lighting	Fluorescent lamp and a power socket 230V AC	VW3 AE 1601	1.500	Page 158
Key switch (Local / Remote)	Key switch in the enclosure door for switching between terminals/bus and local operation	VW3 AE 1801	0.200	Page 159
Motor heating	Includes a circuit breaker, a contactor and the terminals to connect a motor heating	VW3 AE 2101	0.200	Page 158
External Motor fan	Includes a circuit breaker, a contactor and the terminals to connect an external motor fan	VW3 AE 2102	0.200	Page 159
Voltmeter 400 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2301	0.400	Page 159
Voltmeter 500 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2302	0.400	Page 159
Voltmeter 690 V	Measuring instrument built-in in the enclosure door, which indicates the line voltage.	VW3 AE 2303	0.400	Page 159

See product catalogue

Enclosure options depending on the power		
Option	Brief description	Reference
Braking unit	Limits the DC-voltage at generator operation	Page 161
Door handle for main switch	Enables handling without opening the enclosure door	Page 162
Circuit breaker	Provides a safe switching-off at overload	Page 163
Door handle for circuit breaker	Enables handling without opening the enclosure door	Page 164
Undervoltage coil 230 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 164
Undervoltage coil 110 V	When there is no voltage at the undervoltage coil, the circuit breaker switches off.	Page 165
230 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 165
110 V motor for circuit breaker	Remote control of the circuit breaker via control commands is possible by means of this motor drive.	Page 166
Line contactor	Used for the function "line contactor control" to disconnect the drive from the mains	Page 167
12-pulse supply	Contains the components for 12-pulse supply	Page 168
Amperemeter	Measuring instrument built-in in the enclosure door, which indicates the line current.	Page 169
Enclosure heating	Heats the enclosure to avoid frost and condensation up to an ambient temperature of -10°C	Page 170
Motor choke	Reduces the slew rate on the output of the inverter to protect the motor	Page 171
Cable entry via the top	Allows connection of the line and the motor cables from above	Page 173
Enclosure plinth	200 mm plinth	Page 174
Plinth grill fine	Grill for the front side of the plinth of the enclosure	Page 176
Air condition	Cools the power losses of the control part to avoid filter mats in the enclosure door	Page 176

Allocation table for options depending on the power			
Description	ATV61	Order number	Weight [kg]
Braking unit	EXC●C25Y...C40Y	VW3 AE 1004	190.000
	EXS5C25Y...C40Y	VW3 A7E 103	205.000
	EXC●C50Y...C80Y	VW3 AE 1005	190.000
	EXS5C50Y...C80Y	VW3 A7E 104	205.000
Door handle for main switch	EX●●C11Y...C20Y	VW3 AE 0103	1.000
	EX●●C25Y...C40Y	VW3 AE 0104	2.000
	EX●●C50Y...C80Y	VW3 AE 0105	2.000
	EXA●C80Y...M24Y	VW3 AE 0105	2.000
Circuit breaker	EX●●C11Y, C13Y	VW3 AE 0143	4.000
	EX●●C16Y, C20Y	VW3 AE 0145	4.000
	EX●●C25Y...C40Y	VW3 AE 0147	1.400
	EX●●C50Y, C63Y	VW3 AE 0150	–
	EX●●C80Y	VW3 AE 0151	–
	EXA●C80Y	VW3 AE 0169	–
	EXA●M10Y...M12Y	VW3 AE 0170	–
	EXA●M15Y	VW3 AE 0171	–
	EXA●M18Y	VW3 AE 0172	–
EXA●M21Y, M24Y	VW3 AE 0173	–	
Door handle for circuit breaker	EX●●C11Y...C40Y	VW3 AE 0115	2.000
	EX●●C50Y, C63Y	VW3 AE 0116	2.000
	EXA●C80Y...M12Y	VW3 AE 0116	2.000
	EXA●M15Y ... M24Y	–	–
Undervoltage coil 230 V	EX●●C11Y...C63Y	VW3 AE 0117	0.500
	EX●●C80Y	VW3 AE 0118	0.500
	EXA●C80Y...M24Y	VW3 AE 0118	0.500
Undervoltage coil 110V	EX●●C11Y...C63Y	VW3 AE 0119	0.500
	EX●●C80Y	VW3 AE 0120	0.500
	EXA●C80Y...M24Y	VW3 AE 0120	0.500

Allocation table for options depending on the power			
Description	ATV61	Order number	Weight [kg]
230V motor for circuit breaker	EX●●C11Y...C20Y	VW3 AE 0156	3.000
	EX●●C25Y...C40Y	VW3 AE 0157	3.000
	EX●●C50Y, C63Y	VW3 AE 0158	7.000
	EX●●C80Y	VW3 AE 0159	7.000
	EXA●C80Y	VW3 AE 0176	7.000
	EXA●M10Y, M12Y	VW3 AE 0177	7.000
	EXA●M15Y...M24Y	–	–
110V motor for circuit breaker	EX●●C11Y...C20Y	VW3 AE 0162	3.000
	EX●●C25Y...C40Y	VW3 AE 0163	3.000
	EX●●C50Y, C63Y	VW3 AE 0164	7.000
	EX●●C80Y	VW3 AE 0165	7.000
	EXA●C80Y	VW3 AE 0179	7.000
	EXA●M10Y, M12Y	VW3 AE 0180	7.000
	EXA●M15Y...M24Y	–	–
Line contactor	EX●●C11Y...C16Y	VW3 AE 0218	10.000
	EX●●C20Y	VW3 AE 0208	11.000
	EX●●C25Y	VW3 AE 0209	12.000
	EX●●C31Y	VW3 AE 0210	14.000
	EX●●C40Y	VW3 AE 0211	21.000
	EX●●C50Y	VW3 AE 0212	24.000
	EX●●C63Y, C80Y	VW3 AE 0213	28.000
	EXA●C80Y...M12Y	VW3 AE 0227 ¹⁾	42.000
	EXA●M15Y	VW3 AE 0226	84.000
	EXA●M18Y, M21Y	VW3 AE 0226	84.000
	EXA●M24Y	VW3 AE 0226	84.000
¹⁾ When this option is used together with a line reactor, the option VW3 AE 0225 (50.000 kg) must be ordered additionally!			
12-pulse supply	EXA●C80Y	VW3 AE 2415	–
	EXA●M10Y, M12Y	VW3 AE 2416	–
	EXA●M15Y	VW3 AE 2418	–
	EXA●M18Y	VW3 AE 2419	–
	EXA●M21Y, M24Y	VW3 AE 2420	–
Line reactor	EXA●C80Y	VW3 AE 2504	154.000
	EXA●M10Y	VW3 AE 2505	121.000
	EXA●M12Y	VW3 AE 2506	136.000
	EXA●M15Y	VW3 AE 2507	308.000
	EXA●M18Y, M21Y	VW3 AE 2508	242.000
	EXA●M24Y	VW3 AE 2509	273.000
Amperemeter	EX●●C11Y...C16Y	VW3 AE 0404	0.200
	EX●●C20Y...C31Y	VW3 AE 0406	0.200
	EX●●C40Y	VW3 AE 0426	0.200
	EX●●C50Y, C63Y	VW3 AE 0409	0.200
	EX●●C80Y	VW3 AE 0409	0.200
	EXA●C80Y	VW3 AE 0409 (6p) VW3 AE 0428 (12p)	0.200
	EXA●M10Y, M12Y	VW3 AE 0411 (6p) VW3 AE 0421 (12p)	0.200
	EXA●M15Y	VW3 AE 0413 (6p) VW3 AE 0421 (12p)	0.200
	EXA●M18Y, M21Y	VW3 AE 0414 (6p) VW3 AE 0429 (12p)	0.200
	EXA●M24Y	VW3 AE 0415 (6p) VW3 AE 0423 (12p)	0.200

Allocation table for options depending on the power						
Description		ATV61	Order number	Weight [kg]		
Enclosure heating		EX●●C11Y...C40Y	VW3 AE 0501	0.500		
		EX●●C50Y...C80Y	VW3 AE 0502	1.000		
		EXA●C80Y...M12Y	VW3 AE 0502	1.000		
		EXA●M15Y...M24Y	VW3 AE 0503	1.500		
Motor choke		EX●●C11Y, C13Y	VW3 AE 0603	17.000		
		EX●●C16Y, C20Y	VW3 AE 0604	35.000		
		EX●●C25Y, C31Y	VW3 AE 0605	64.000		
		EX●●C40Y	VW3 AE 0606	102.000		
		EXC2C50Y	VW3 AE 0626	192.000		
		EXC5C50Y	VW3 AE 0628	192.000		
		EXS5C50Y	VW3 AE 0630	197.000		
		EXC2C63Y, C80Y	VW3 AE 0627	234.000		
		EXC5C63Y, C80Y	VW3 AE 0629	234.000		
		EXS5C63Y, C80Y	VW3 AE 0631	234.000		
		EXA●C80Y...M12Y	VW3 AE 0635	132.000		
		EXA●M15Y...M24Y	VW3 AE 0636	264.000		
	Cable entry via the top	Without motor choke	EXC●C11Y...C20Y	VW3 AE 0728	108.000	
EXS5C11Y...C20Y			VW3 AE 0732	–		
EXC●C25Y...C40Y			VW3 AE 0729	126.000		
EXS5C25Y...C40Y			VW3 AE 0733	–		
EXC●C50Y...C80Y			VW3 AE 0730	252.000		
EXS5C50Y...C80Y			VW3 AE 0734	252.000		
EXA●C80Y...M12Y			VW3 AE 0740	126.000		
EXA●M15Y...M24Y			VW3 AE 0741	150.000		
With motor choke		EXC●C11Y...C20Y	VW3 AE 0728	108.000		
		EXS5C11Y...C20Y	VW3 AE 0735	108.000		
		EXC●C25Y...C40Y	VW3 AE 0729	126.000		
		EXS5C25Y...C40Y	VW3 AE 0736	126.000		
		EXC●C50Y...C80Y	VW3 AE 0731	126.000		
		EXS5C50Y...C80Y	VW3 AE 0737	252.000		
		EXA●C80Y...M12Y	VW3 AE 0740	126.000		
		EXA●M15Y...M24Y	VW3 AE 0741	150.000		
		Enclosure plinth 200 mm	No option	EXC●C11Y...C20Y	VW3 AE 0801	11.000
				EXC●C25Y...C40Y	VW3 AE 0802	13.000
				EXC●C50Y...C80Y	VW3 AE 0804	17.000
				EXA●C80Y...M12Y	VW3 AE 0820 ²⁾	38.000
With motor choke	EXA●M15Y...M24Y		VW3 AE 0822	69.000		
	EXC●C11Y...C20Y		VW3 AE 0801	11.000		
	EXC●C25Y...C40Y		VW3 AE 0802	13.000		
	EXC●C50Y...C80Y		VW3 AE 0806	26.000		
with line reactor	EXA●C80Y...M12Y	VW3 AE 0820 ²⁾	38.000			
	EXA●M15Y...M24Y	VW3 AE 0822	69.000			
	EXA●C80Y...M12Y	VW3 AE 0820 ²⁾	38.000			
	EXA●M15Y...M24Y	VW3 AE 0824	78.000			
2) When using a NDU and line contactor the option VW3 AE 0821 (40.000 kg) has to be used instead of the option VW3 AE 0820.						
Additional enclosure plinth for cable entry via the top	Without motor choke	EXC●C11Y...C40Y	VW3 AE 0807	9.000		
		EXC●C50Y...C80Y	VW3 AE 0808	18.000		
		EXA●C80Y...M12Y	VW3 AE 0825	9.000		
		EXA●M15Y...M24Y	VW3 AE 0826	11.000		
	With motor choke	EXC●C11Y...C40Y	VW3 AE 0807	9.000		
		EXC●C50Y...C80Y	VW3 AE 0809	9.000		
		EXA●C80Y...M12Y	VW3 AE 0825	9.000		
		EXA●M15Y...M24Y	VW3 AE 0826	11.000		

Allocation table for options depending on the power				
Description		ATV61	Order number	Weight [kg]
Additional enclosure plinth for braking unit		EXC●C25Y...C80Y	VW3 AE 0810	9.000
Plinth grill fine		EXS5C11Y...C20Y	VW3 AE 0812	2.000
		EXS5C25Y...C40Y	VW3 AE 0813	3.000
		EXS5C50Y...C80Y	VW3 AE 0815	5.000
Air condition	Without motor choke	EXS5C11Y...C20Y	VW3 AE 0919	56.000
		EXS5C25Y...C40Y	VW3 AE 0920	71.000
		EXS5C50Y...C80Y	VW3 AE 0921	86.000
	With motor choke	EXS5C11Y...C20Y	VW3 AE 0922	71.000
		EXS5C25Y...C40Y	VW3 AE 0923	71.000
		EXS5C50Y...C80Y	VW3 AE 0924	86.000

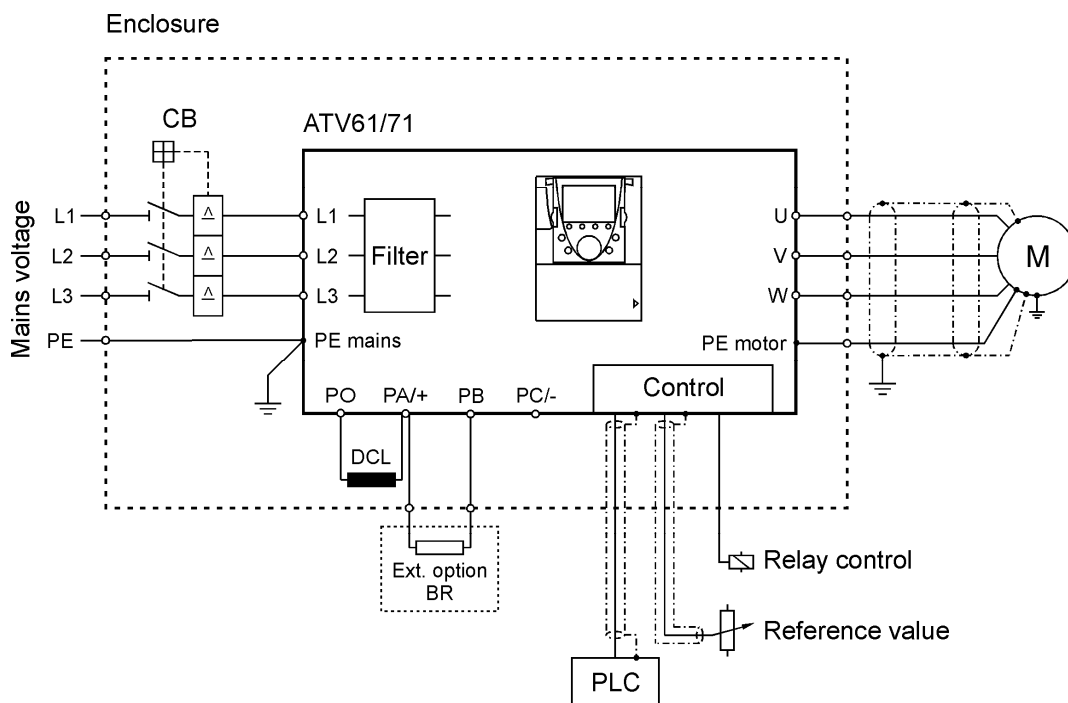
Wiring diagram

The following diagrams show the typical wiring of the frequency inverters including the options which may be required for protection of the plant or the device, depending on the application.

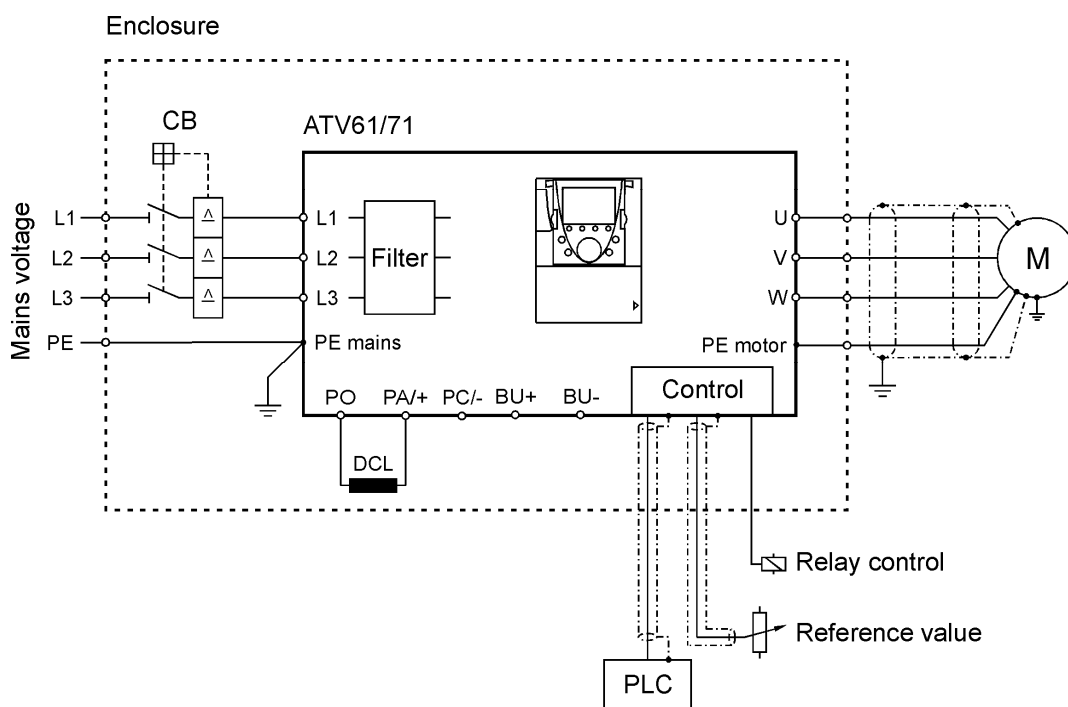
Description of the used abbreviations:

- ATV61/71 Frequency inverter
- MS..... Main switch built-in as standard
(to be used if required according to the local regulations)
- Option CB Circuit breaker
Can be installed instead of the main switch
- NH Main fuses built-in as standard considering table "chapter "Fuses and cable cross sections" "
- Option LC..... Line contactor
(to be used if required according to the local regulations)
- Line reactor Line reactor built-in as standard to reduce the current harmonics on the mains caused by the DC link. For ATV61EXA●●●●● it is available as option.
- DCL The DC choke is built-in as standard instead of a line reactor at ATV61EXS5●●●N4.
- internal filter EMC filter built-in as standard
considering category C3 according to EN 61800-3 "Use in industrial environments"
- Opt. motor choke..... To reduce the voltage peaks at the motor in case of long motor cables
- Opt. sinus filter..... For nearly sinusoidal motor voltage and for prevention of additional noises at the motor.
- Option BU Braking unit
At devices with low power a braking transistor is built-in as standard. Beyond it a braking unit can be used optionally. See chapter "Braking unit BU", page 161
- Option BR Braking resistor
Option for short deceleration time or short-time dynamic loads

ATV61ES5D90N4...C22N4

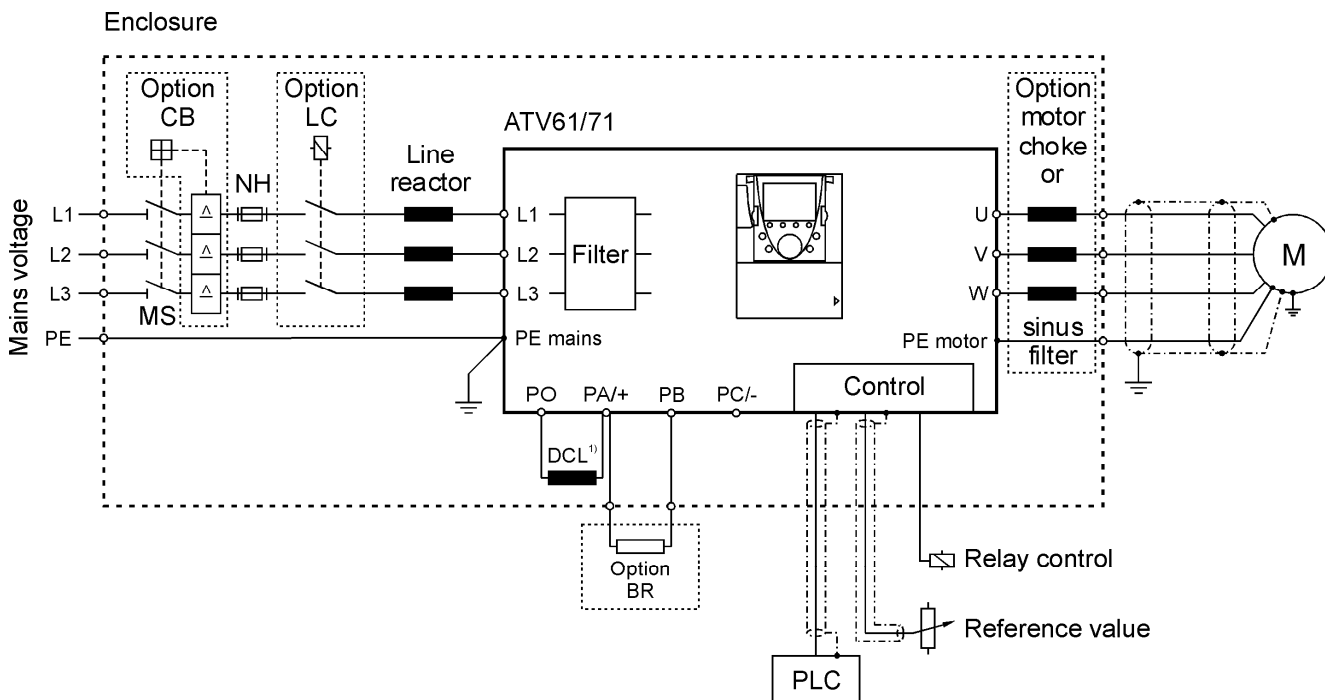


ATV61ES5C25N4...C63N4



ATV61EX●●D90N4...C22N4
 ATV61EX●●D90N...C16N
 ATV61EX●●C11Y...C20Y

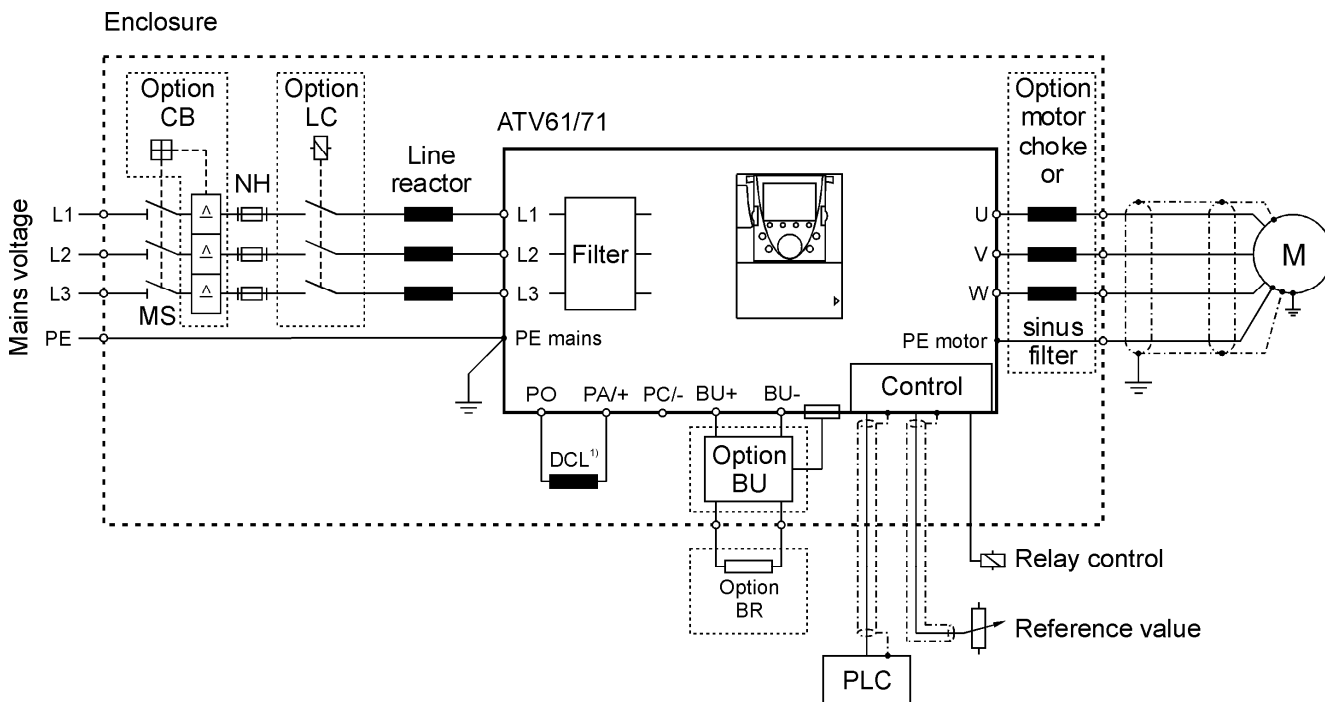
Standard design 6-pulse



1) At ATV61EXS5●●●N4 a DC choke DCL is built-in instead of a line reactor.

ATV61EX●●C25N4...C40N4
 ATV61EX●●C20N...C31N
 ATV61EX●●C25Y...C40Y

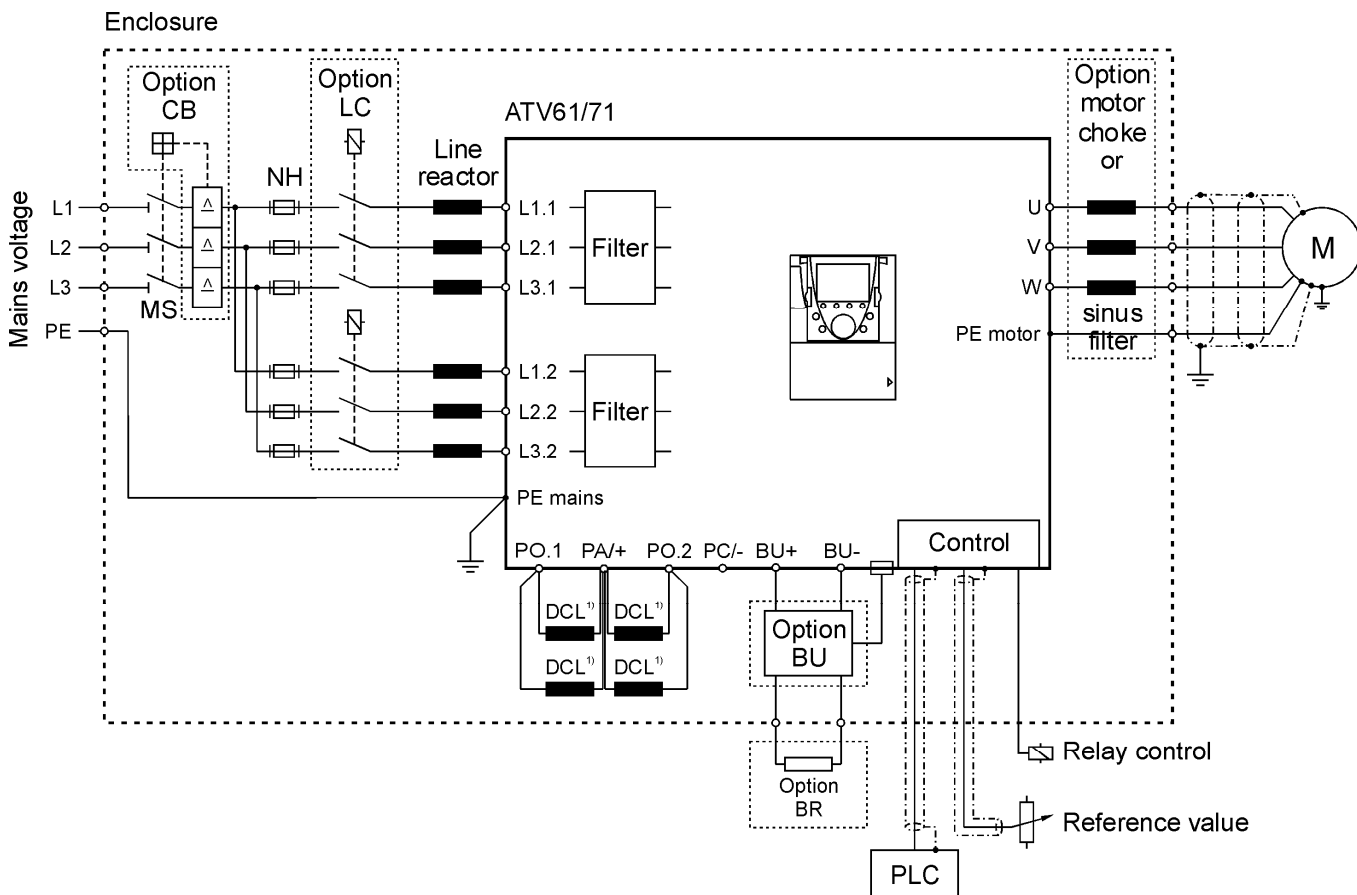
Standard design 6-pulse



1) At ATV61EXS5●●●N4 a DC choke DCL is built-in instead of a line reactor.

ATV61EX●●C50N4...C63N4
 ATV61EX●●C40N...C63N
 ATV61EX●●C50Y...C80Y

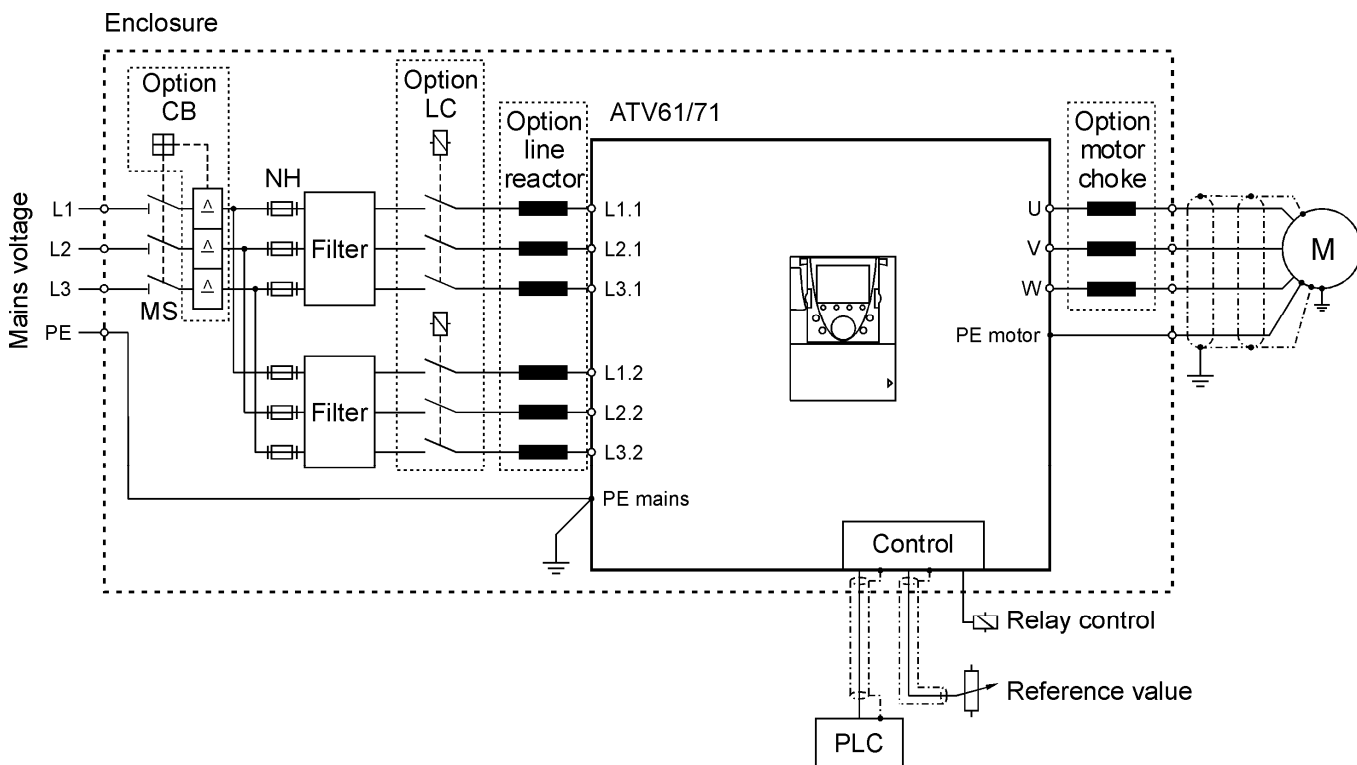
Standard design 6-pulse



1) At ATV61EXS5●●●N4 a DC choke DCL is built-in instead of a line reactor.

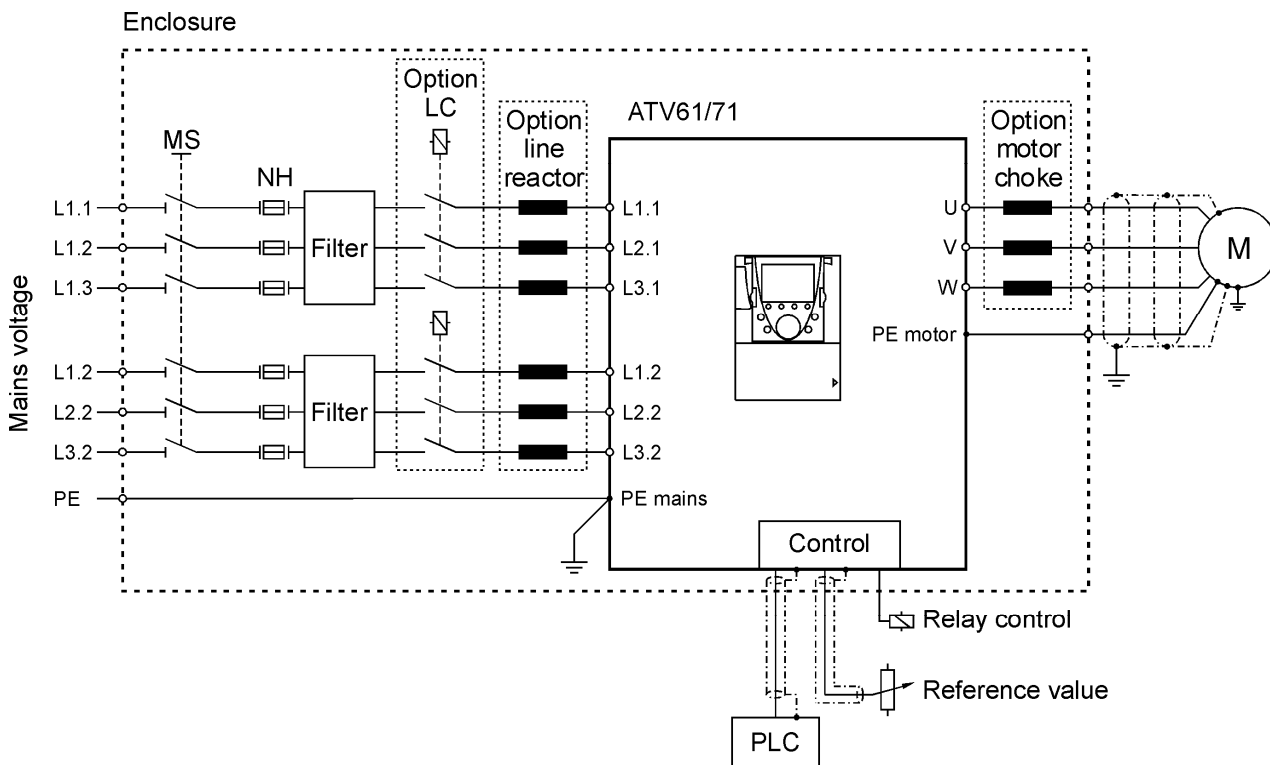
ATV61EXA•C63N4...C71N4
 ATV61EXA•C63N...C90N
 ATV61EXA•C80Y...M12Y

Standard design 6-pulse



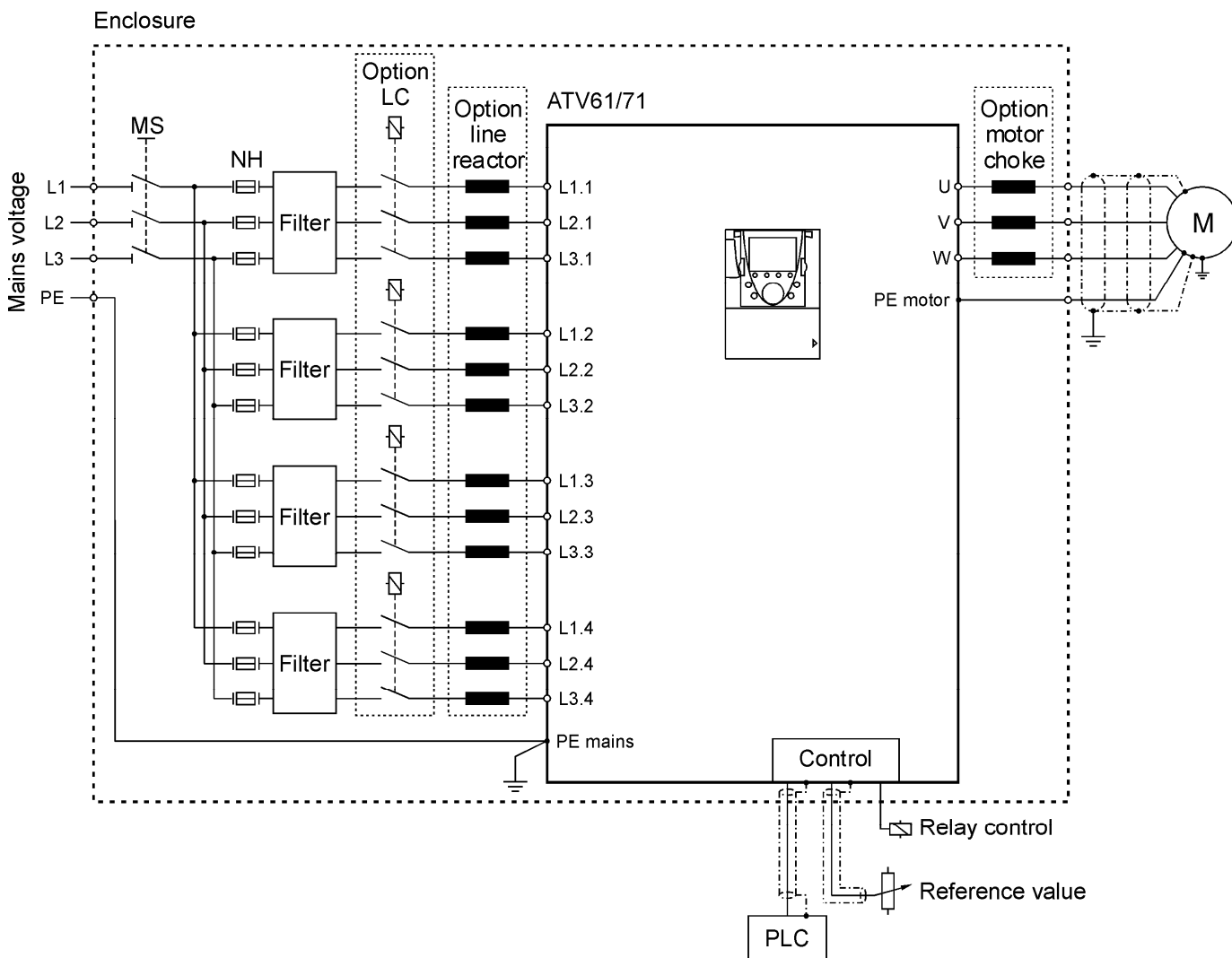
ATV61EXA•C63N4...C71N4
ATV61EXA•C63N...C90N
ATV61EXA•C80Y...M12Y

Optional 12-pulse design



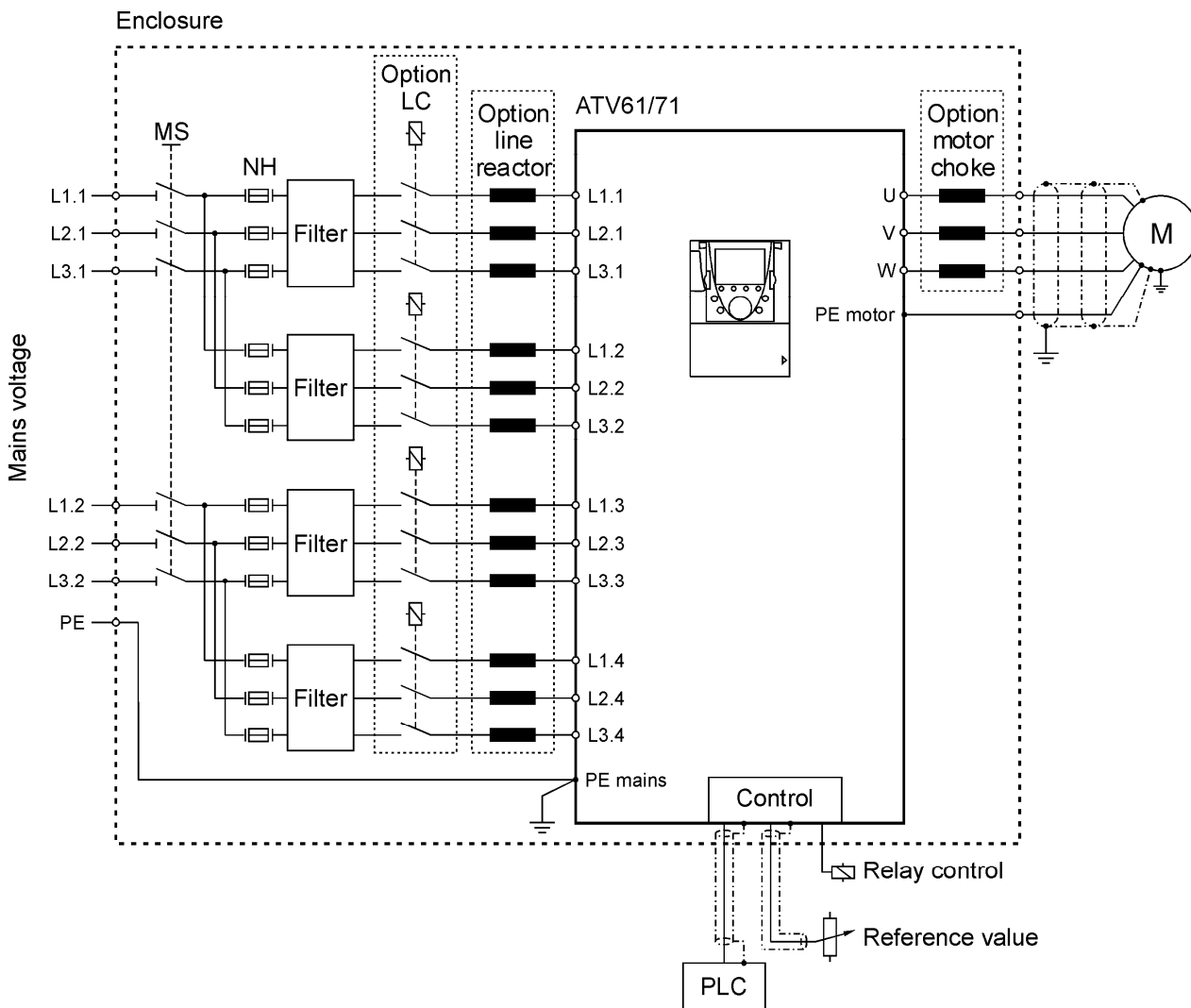
ATV61EXA•C90N4...M14N4
 ATV61EXA•M11N...M18N
 ATV61EXA•M15Y...M24Y

Standard design 6-pulse



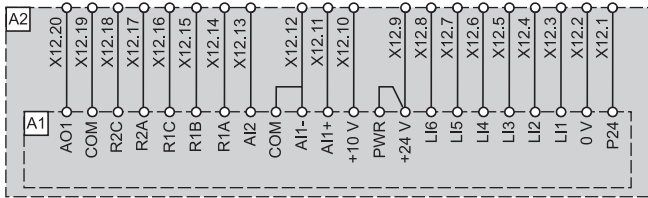
ATV61EXA•C90N4...M14N4
ATV61EXA•M11N...M18N
ATV61EXA•M15Y...M24Y

Optional 12-pulse design



Control terminals X12 for the basic device

The signal inputs and outputs of the frequency inverter are wired to the customer terminals X12 with plug connection (max. cable cross section: 2.5 mm²).

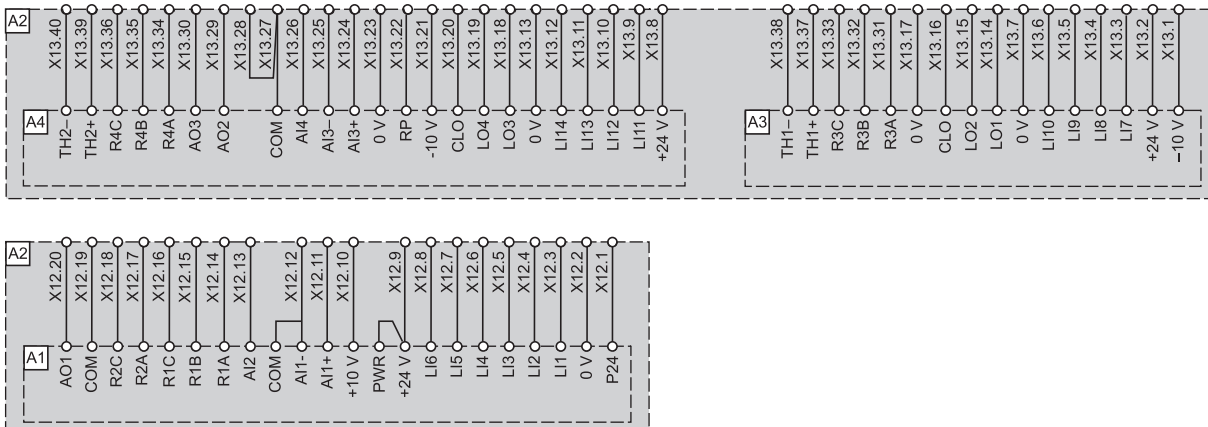


Order number: VW3 AE 1201

- A1 Frequency inverter ATV61
- A2 Enclosure

Control terminals X12 and X13 for the basic device and I/O extension cards

The signal inputs and outputs of the frequency inverter and of the option cards are wired to the customer terminals X12 and X13 with plug connection (max. cable cross section: 2.5 mm²).



Order number: VW3 AE 1202

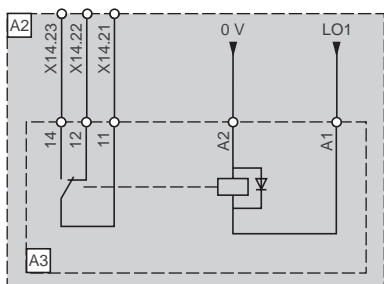
- A1 Frequency inverter ATV61
- A2 Enclosure
- A3 Basic I/O extension card
- A4 Extended I/O extension card

Relay output OC

This option contains a 24 V DC relay with a switching capacity of max. 6 A at 250 V AC or 30 V DC. The potential-free signal outputs are directly connected to the customer control terminals X14 (max. cable cross section: 4 mm²). The inductor is wired to the logic output of the frequency inverter. With this option each logic status information of the inverter or the process can be issued as a message by means of a logic output.



This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 157 for further information.



Relay output LO1

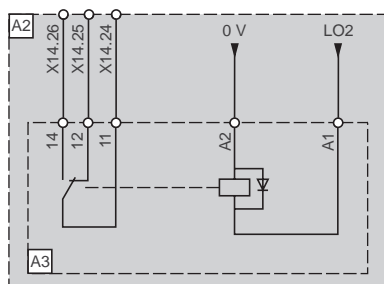
Order number: VW3 AE 2201

A2 Enclosure

A3 Relay



This option requires a basic I/O extension card!



Relay output LO2

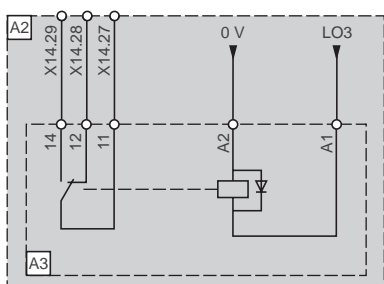
Order number: VW3 AE 2201

A2 Enclosure

A3 Relay



This option requires a basic I/O extension card!



Relay output LO3

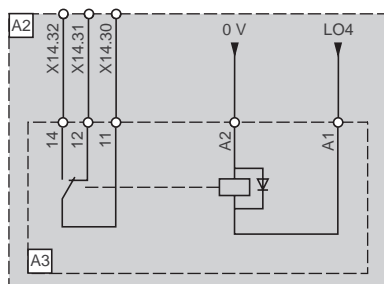
Order number: VW3 AE 2201

A2 Enclosure

A3 Relay



This option requires an extended I/O extension card!



Relay output LO4

Order number: VW3 AE 2201

A2 Enclosure

A3 Relay



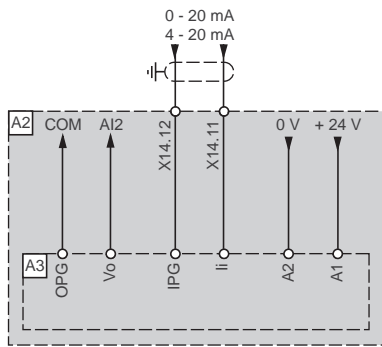
This option requires an extended I/O extension card!

Additional electrical input isolation

This option contains an isolated amplifier configured for an analog input. The signal inputs of the amplifier are directly connected to the customer control terminals X14 (max. cable cross section: 4 mm²). The output is wired to the analog input of the frequency inverter. It operates according to the principle of optoelectronic potential separation and has three-way separation between input, output and supply.



This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 157 for further information.



Analog input AI2

Order number: VW3 AE 1901

A2 Enclosure

A3 Isolated amplifier

Additional electrical output isolation

This option contains an isolated amplifier configured for an analog output. The signal outputs of the amplifier are directly connected to the customer control terminals X14 (max. cable cross section: 4 mm²). The input is wired to the analog output of the frequency inverter. It operates according to the principle of optoelectronic potential separation and has three-way separation between input, output and supply.

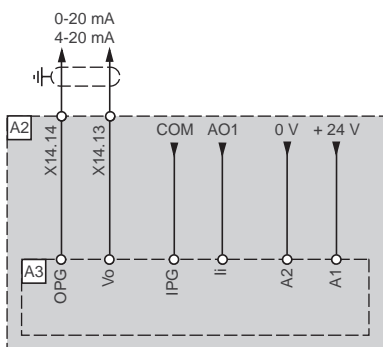


This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 157 for further information.

Analog output AO1

Order number: VW3 AE 1902

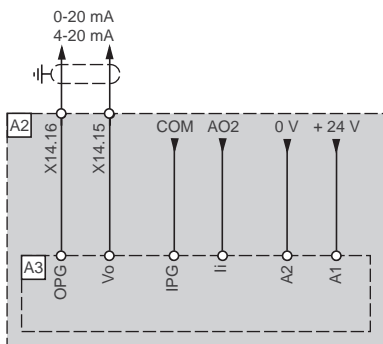
- A2 Enclosure
- A3 Isolated amplifier



Analog output AO2

Order number: VW3 AE 1902

- A2 Enclosure
- A3 Isolated amplifier

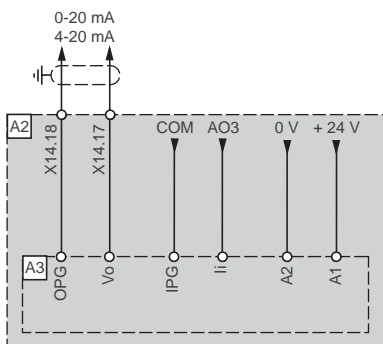


This option requires an extended I/O extension card!

Analog output AO3

Order number: VW3 AE 1902

- A2 Enclosure
- A3 Isolated amplifier



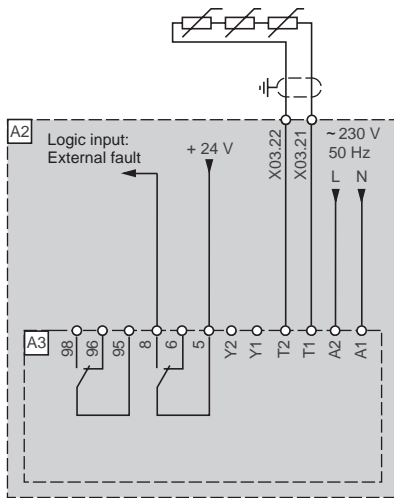
This option requires an extended I/O extension card!

PTC relay

This option consists of a PTC thermistor relay to monitor the PTC thermistors of the motor. Up to three PTC sensors can be connected to this option. The output of the PTC thermistor relay is assigned to the inverter terminals which can be parameterized for alarm or trip. The thermistor input is wired to the customer terminals X03 (max. cable cross section: 4 mm²).



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 156 for further information.




Order number: VW3 AE 2001

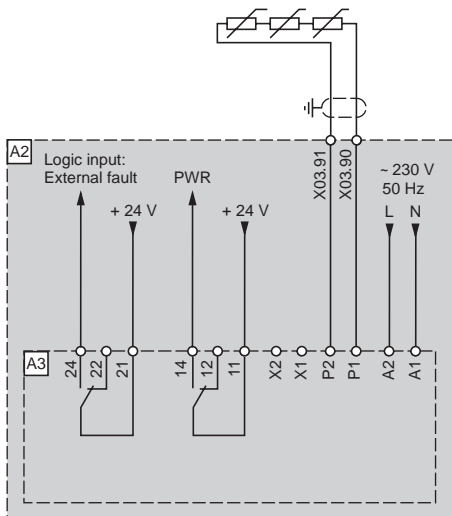
A2 Enclosure

A3 PTC relay

PTC relay with PTB (ATEX) certification

This option consists of a PTC thermistor relay with PTB certificate for operation in EX-environments to monitor the PTC thermistors of the motor. Up to three PTC sensors can be connected to this option. The output of the PTC thermistor relay is assigned to the inverter terminals (PWR). The thermistor input is wired to the customer terminals X03 (max. cable cross section: 4 mm²).

 This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 156 for further information.




Order number: VW3 AE 2002

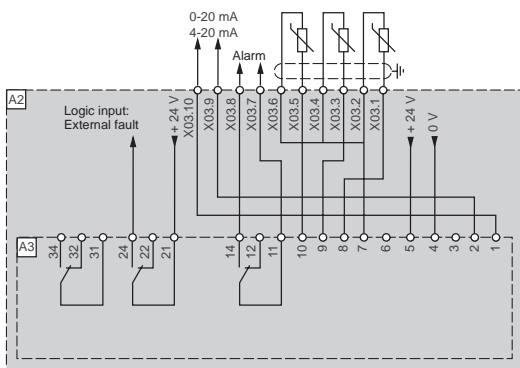
A2 Enclosure
 A3 PTC relay

Pt100 relay

Pt100 sensors in motor winding

This option contains a Pt100 relay to monitor the Pt100 sensors of the motor. As standard it is prepared for three sensors and the trip will cause a trip shut-down at the inverter. The input for the sensors, the alarm relay and the analog output are wired to the customer terminals X03 (max. cable cross section: 4 mm²).

 This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 157 for further information.




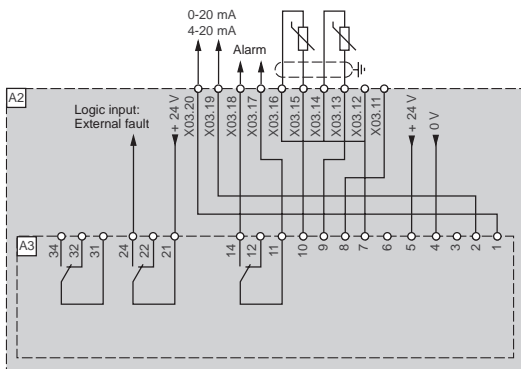
Order number: VW3 AE 2003

A2 Enclosure
 A3 Pt100 relay

Pt100 sensors in bearings

This option contains a Pt100 relay to monitor the Pt100 sensors of the motor. As standard it is prepared for two sensors for the bearings. The alarm message is assigned to the terminals and the trip will cause a trip shut-down at the inverter. The input for the sensors, the alarm relay and the analog output are wired to the customer terminals X03 (max. cable cross section: 4 mm²).

 This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 157 for further information.




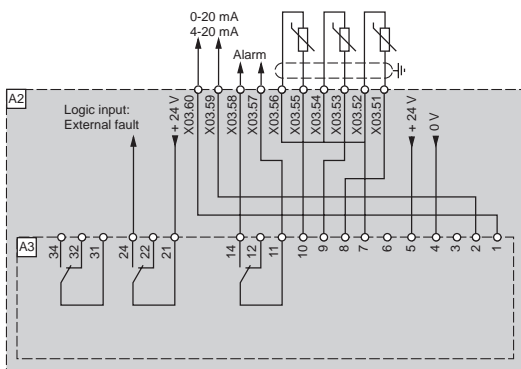
Order number: VW3 AE 2004

- A2 Enclosure
- A3 Pt100 relay

Pt100 sensors in the transformer

This option contains a Pt100 relay to monitor the Pt100 sensors in the transformer. As standard it is prepared for three sensors for the windings. The alarm message is assigned to the terminals and the trip will cause a trip shut-down at the inverter. The input for the sensors, the alarm relay and the analog output are wired to the customer terminals X03 (max. cable cross section: 4 mm²).

 This option requires a 24 V DC buffer voltage. See chapter "Buffer voltage 24 V DC", page 157 for further information.



Order number: VW3 AE 2005

- A2 Enclosure
- A3 Pt100 relay

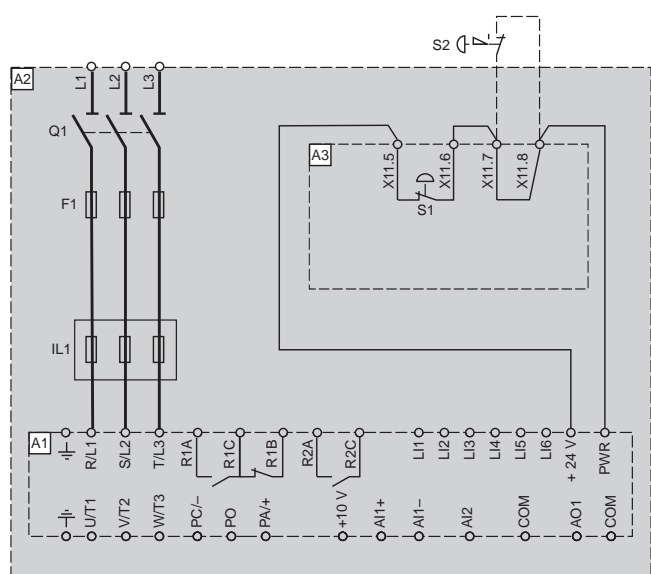
Safe Standstill

The Altivar frequency inverters include the "Safe Standstill" (Power Removal) safety function as standard. This function prevents any unintended start-up of the motor and guarantees the safety of the machine and plant personnel. The Safe Standstill function is wired to the customer terminals X11 (max. cable cross section: 4 mm²).

Safety category 1
Stop category 0

according to EN 954-1 / ISO 13849-1 category 1; IEC/EN 61508, SIL1
according to IEC/EN 60204-1

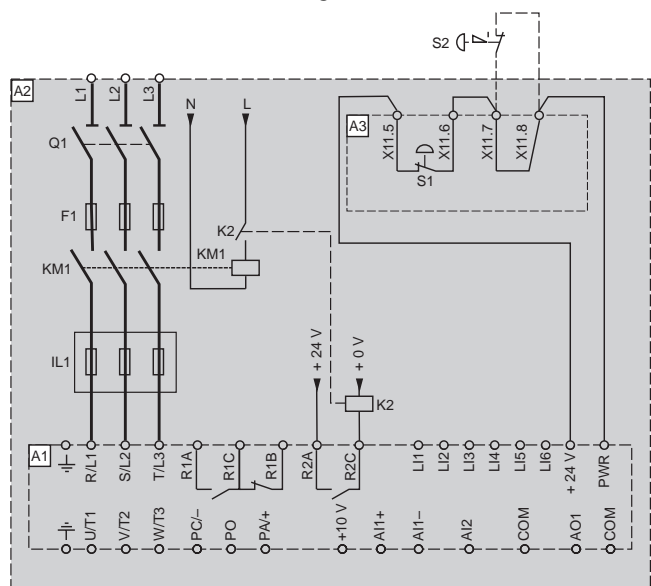
Emergency stop button



Order number: VW3 AE 1504

- A1 Frequency inverter ATV61
- A2 Enclosure
- A3 Emergency stop wiring
- S1 Emergency stop button consisting of
Mushroom head pushbutton (Harmony style 4:
ZB4 BS54)
Auxiliary contact (Harmony style 4: ZB4 BZ102)

When line contactor is existing:

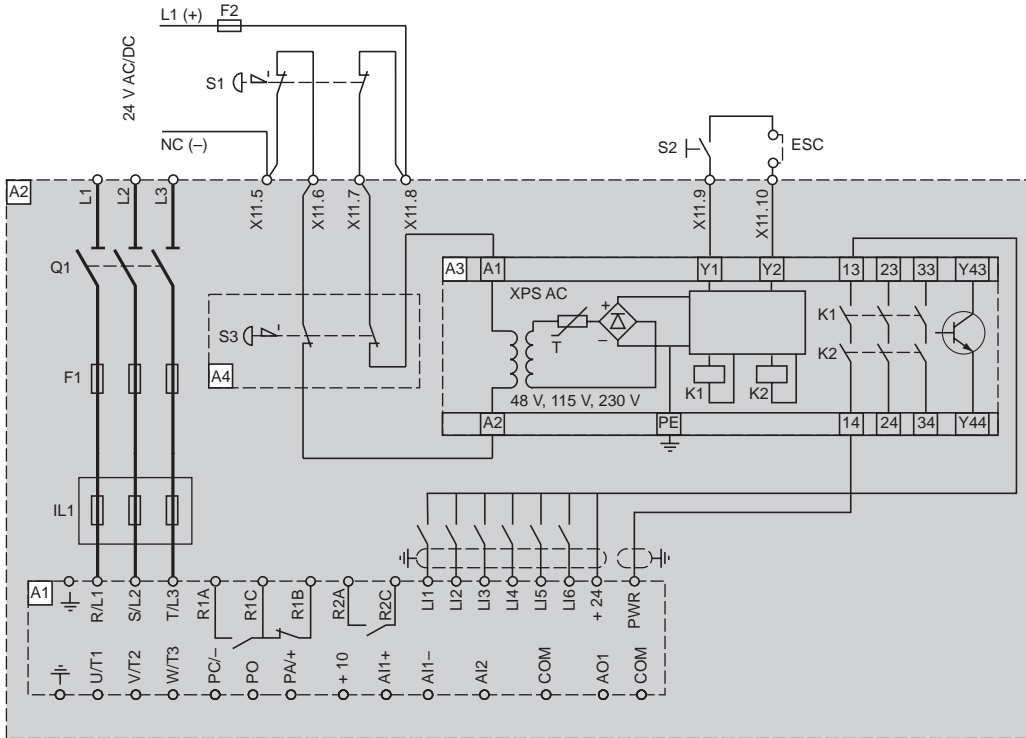


- A1 Frequency inverter ATV61
- A2 Enclosure
- A3 Emergency stop wiring
- S1 Emergency stop button consisting of
Mushroom head pushbutton (Harmony style 4:
ZB4 BS54)
Auxiliary contact (Harmony style 4: ZB4 BZ102)

Safety category 3
Stop category 0

according to EN 954-1 / ISO 13849-1 category 3; IEC/EN 61508, SIL2
according to IEC/EN 60204-1

"Preventa type AC" fault relay



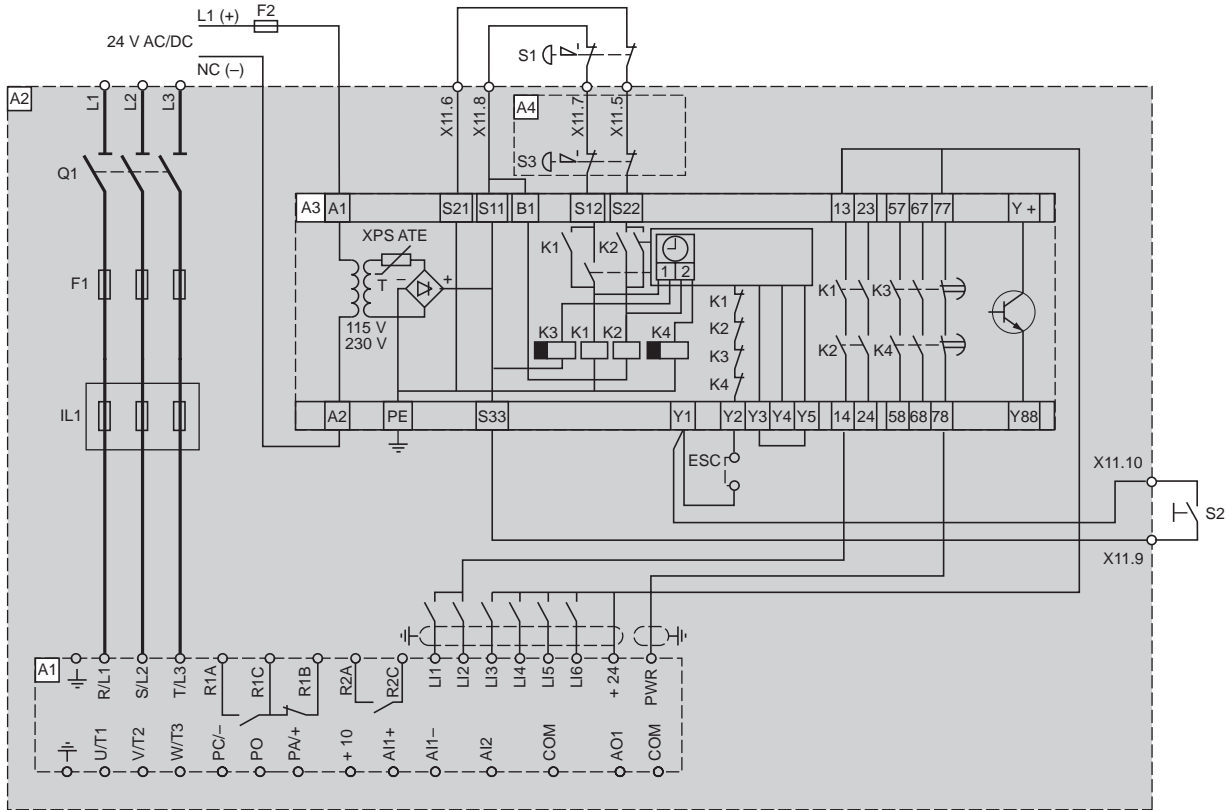
Order number: VW3 AE 1502

- A1 Frequency inverter ATV61
- A2 Enclosure
- A3 Safety switching device "Preventa XPS-AC5121"
- A4 Emergency stop button (VW3 AE 1501)
- S3 Emergency stop button consisting of
Mushroom head pushbutton (Harmony style 4: ZB4
BS54)
Auxiliary contact (Harmony style 4: ZB4 BZ102)

Safety category 3
Stop category 1

according to EN 954-1 / ISO 13849-1 category 3; IEC/EN 61508, SIL2
according to IEC/EN 60204-1

"Preventa type ATE" fault relay



Order number: VW3 AE 1503

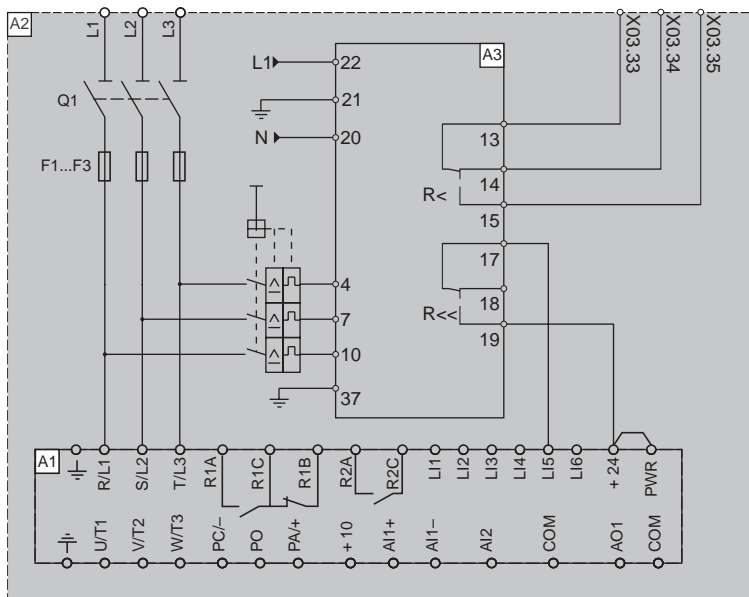
- A1 Frequency inverter ATV61
- A2 Enclosure
- A3 Safety switching device "Preventa XPS-ATE5110"
- A4 Emergency stop button (VW3 AE 1501)
- S3 Emergency stop button consisting of
Mushroom head pushbutton (Harmony style 4: ZB4 BS54)
Auxiliary contact (Harmony style 4: ZB4 BZ102)

Insulation monitoring for IT networks

This option monitors each phase to earth fault.



This option is only qualified for IT networks.



- A1Frequency inverter ATV61
- A2Enclosure
- A3Isolation monitoring device

Order number: VW3 AE 2601

The trigger R<< is connected to the inverter as standard.
The alarm message R< is assigned to the terminals (X3.33 to X3.35).



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 156 for further information.

Design for IT networks

The frequency inverter is prepared for connection to nongrounded networks (IT networks).

Order number: VW3 AE 2701



When a 230 V control voltage is required for the ATV61EX.....N4 devices, the option control transformer or an external control supply is necessary.

Control of MV supply

When using this option the frequency inverter is able to control the circuit breaker at the primary side of the mains transformer.

Order number: VW3 AE 2801

Supply voltage 230 V AC

For some options and for the supply of the cooling system of high-power devices a 230 V/50 Hz supply voltage is necessary.

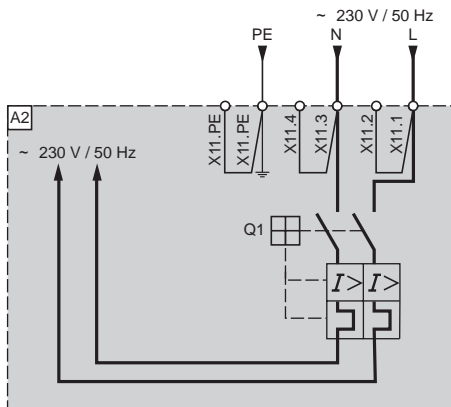
Following devices already include a control voltage transformer for 230 V (partially also for 400 V) as standard:

- ATV61EXA●●●●N4
- ATV61EX●●●●●N
- ATV61EX●●●●●Y

When the control voltage is provided external, the option "external supply voltage" has to be selected.

Option external supply terminals

This option includes customer terminals X11 (max. cable cross section: 4 mm²) for the connection of an external supply voltage and a circuit breaker with 6 A for protection. The external supply voltage has to be dimensioned for a load from 225 up to 800 kVA, depending on the used 230 V options.



Order number: VW3 AE 1301

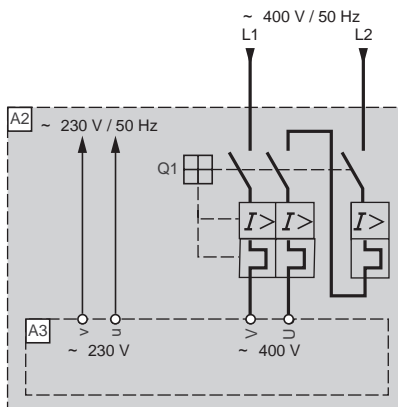
- A2 Enclosure
- Q1 Circuit breaker 6A
- X11 Customer terminals

Option control transformer 400 V / 230 V

If the 230V supply voltage cannot be provided external, it is possible to integrate a control voltage transformer belated at following devices:

- ATV61EXC●●●●N4
- ATV61EXS5●●●●N4

This option includes a supply voltage transformer 400 V / 230 V and a motor circuit breaker.



Order number: VW3 AE 0302 (500 VA)
 VW3 AE 0303 (800 VA)

- A2 Enclosure
- A3 Option control transformer
- K1 Line contactor
- Q1 Motor circuit breaker

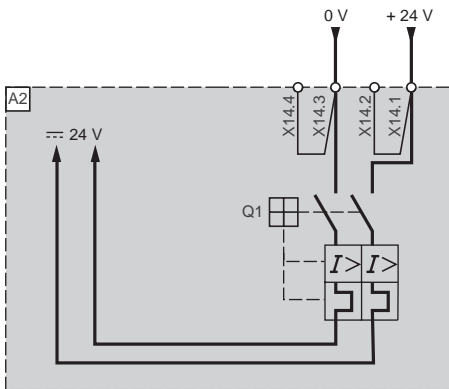
Buffer voltage 24 V DC

A buffer voltage is necessary for the options line contactor (controlled by the inverter), additional electrical isolation and control relay for open collector or if the control electronic of the frequency inverter without mains supply should be in operation (e.g. to keep the bus communication alive).

There are two possibilities to generate this voltage:

External buffer voltage

This option includes customer terminals X14 (max. cable cross section: 4 mm²) for the connection of an external buffer voltage (min. 2 A) and a circuit breaker with 2 A for protection.



Order number: VW3 AE 1402

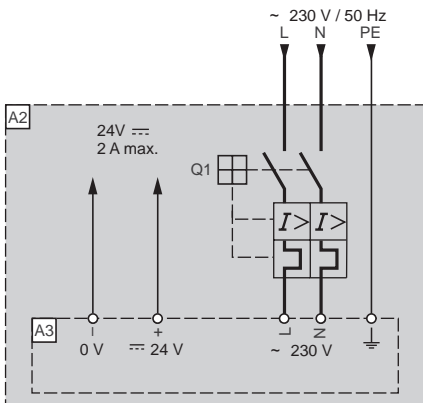
- A2 Enclosure
- Q1 Circuit breaker 2A
- X14 Customer terminals

Additional 24 V DC power supply

This option includes a fuse protected 24 V / 1.6 A DC power supply and a circuit breaker.



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 156 for further information.




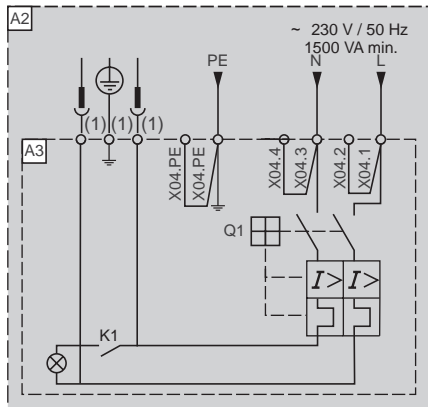
Order number: VW3 AE 1401

- A2 Enclosure
- A3 Additional 24 V power supply
- Q1 Circuit breaker 2A

Enclosure lighting

This option contains a fluorescent lamp and a power socket according to VDE standard (230 V / 50 Hz), a door contact switch and a circuit breaker. The option is wired to the customer terminals X04 (max. cable cross section: 4 mm²).

 To guarantee an operation after mains off, an additional external 230 V supply (min. 1500 VA) will be necessary! This supply has to be human protected!




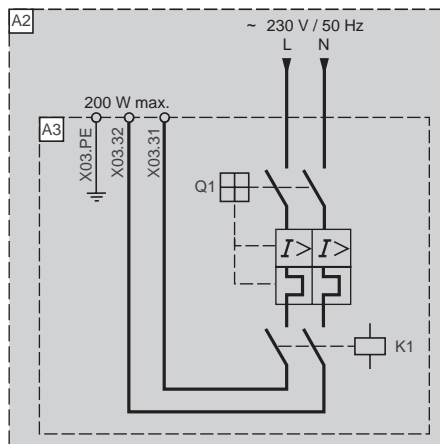
Order number: VW3 AE 1601

- A2 Enclosure
- A3 Enclosure lamp
- K1 Door contact
- Q1 Circuit breaker 2A

Motor heating

This option includes the terminals and a contactor for an external motor heating. It allows to connect a motor heater up to 200 W. The output is wired to the customer terminals X03 (max. cable cross section: 4 mm²). The activation takes place by the line contactor or by the inverter. The motor heating is active when the inverter is in off-state.

 This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 156 for further information.



Order number: VW3 AE 2101

- A2 Enclosure
- A3 Motor heater
- K1 Contactor
- Q1 Motor circuit breaker

External motor fan

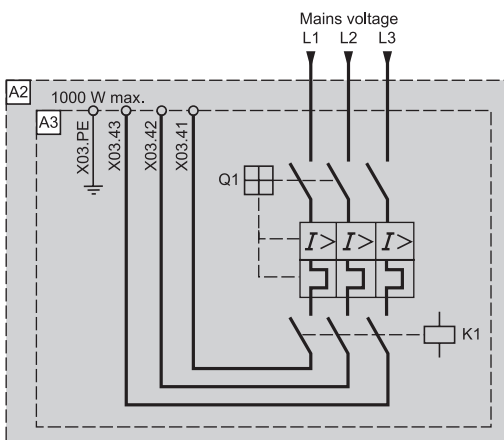
This option includes the terminals, a contactor and a circuit breaker for an external motor fan. It allows to connect an external motor fan up to 1000 W. The output is wired to the customer terminals X03 (max. cable cross section: 4 mm²). The activation takes place by the line contactor or by the inverter. The external motor fan is active when the inverter is in operation.



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 156 for further information.



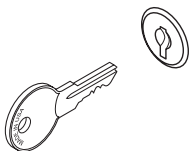
For this option the mains voltage and the voltage of the external fan must be identical. Different voltages on request.



Order number: VW3 AE 2102

- A2 Enclosure
- A3 Protected supply voltage
- K1 Contactor
- Q1 Motor circuit breaker

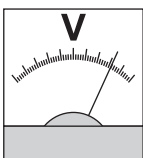
Key switch „local / remote“



This option includes a key switch built-in the enclosure door, which switches between remote mode (terminals or bus) and panel mode. The panel control of the device occurs by means of the keys on the built-in LED-keypad or the removable operation panel, which is also built-in the enclosure door.

Order number: VW3 AE 1801

Voltmeter „Line voltage“



This option indicates the line voltage. It includes a measuring instrument built-into the enclosure door and a phase selection switch.

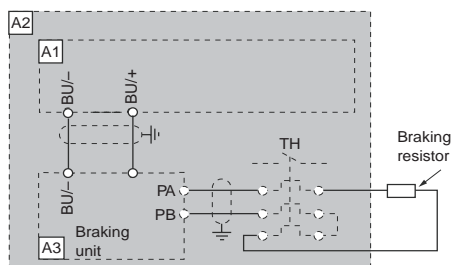


Also in case of 12-pulse supply only one voltmeter is built-in. If two instruments are desired, you have to order two instruments.

Order number:

- Supply voltage 400 V VW3 AE 2301
- Supply voltage 500 V VW3 AE 2302
- Supply voltage 690 V VW3 AE 2303

Braking unit BU



- A1..... Frequency inverter ATV61
- A2..... Enclosure ATV61EXC●
- A3..... Braking unit

The use of the option braking unit is required if more power is returned to the DC link during the braking procedure than the losses in the motor and inverter amount to or the application requires very short braking times.

The braking unit (internally or as an external option) is controlled and monitored by the frequency inverter. If the DC link voltage exceeds an adjustable value due to a braking procedure, an external braking resistor is switched into the DC link as a consumer. The braking resistor converts the power incurred into heat and thus prevents a further rising of the DC link voltage and thus a shut-down with overvoltage.

This option is only necessary for frequency inverters with high power; below these devices there is already a braking transistor built-in!

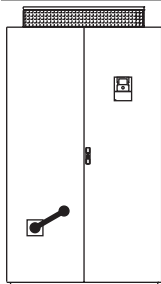
Parameters permit the entry of the resistor data and thus the protection of the braking resistor from an excessively long operating time.

If the braking resistor does not match the overload characteristic to be used or the local regulations require an additional protective device, a thermal relay should be integrated into the mains disconnection mechanism.

Allocation table

Description	ATV61	Order number	Weight [kg]	
Braking unit	400 V	EX●●C25N4, C31N4	VW3 A7E 101	31.000
		EXC●C40N4...C63N4	VW3 AE 1003	190.000
		EXS5C40N4...C63N4	VW3 A7E 102	205.000
	500 V	EXC●C20N...C31N	VW3 AE 1004	190.000
		EXS5C20N...C31N	VW3 A7E 103	205.000
		EXC●C40N...C63N	VW3 AE 1005	190.000
		EXS5C40N...C63N	VW3 A7E 104	205.000
	690 V	EXC●C25Y...C40Y	VW3 AE 1004	190.000
		EXS5C25Y...C40Y	VW3 A7E 103	205.000
		EXC●C50Y...C80Y	VW3 AE 1005	190.000
		EXS5C50Y...C80Y	VW3 A7E 104	205.000

Door handle for main switch



The main switch is able to switch the supply voltage of the frequency inverter. The external door handle enables handling of the switch without opening the enclosure door.

The main switch is built-in as standard. This option contains only an extended spindle for the door handle.

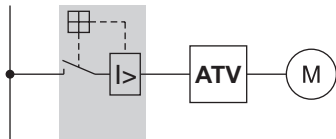


In case of 12-pulse design this option is not permitted because the 12-pulse main switch already includes a door handle.

Allocation table

Description		ATV61	Order number	Weight [kg]
Isolating handle for switch	400 V	EX●●D90N4...C13N4	VW3 AE 0103	1.000
		EX●●C16N4...C31N4	VW3 AE 0104	2.000
		EX●●C40N4...C63N4	VW3 AE 0105	2.000
		EXA●C63N4...M14N4	VW3 AE 0105	2.000
	500 V	EX●●D90N...C16N	VW3 AE 0103	1.000
		EX●●C20N...C31N	VW3 AE 0104	2.000
		EX●●C40N...C63N	VW3 AE 0105	2.000
		EXA●C63N...M18N	VW3 AE 0105	2.000
	690 V	EX●●C11Y...C20Y	VW3 AE 0103	1.000
		EX●●C25Y...C40Y	VW3 AE 0104	2.000
		EX●●C50Y...C80Y	VW3 AE 0105	2.000
		EXA●C80Y...M24Y	VW3 AE 0105	2.000

Circuit breaker



The circuit breaker is built-in instead of the main switch. It provides a safe switching-off at overload.

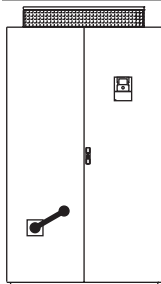


For 12-pulse supply the option "Circuit breaker" is only available on request.

Allocation table

Description	ATV61	Order number	Weight [kg]	
Circuit breaker	400 V	EX●●D90N4...C13N4	VW3 AE 0106	–
		EX●●C16N4	VW3 AE 0107	1.400
		EX●●C22N4	VW3 AE 0108	1.400
		EX●●C25N4	VW3 AE 0109	1.400
		EX●●C31N4	VW3 AE 0110	9.400
		EX●●C40N4	VW3 AE 0111	–
		EX●●C50N4	VW3 AE 0112	–
		EX●●C63N4	VW3 AE 0113	–
		EXA●C63N4, C71N4	VW3 AE 0113	–
		EXA●C90N4	VW3 AE 0166	–
		EXA●M11N4	VW3 AE 0167	–
		EXA●M13N4, M14N4	VW3 AE 0168	–
	500 V		EX●●D90N	VW3 AE 0141
		EX●●C11N	VW3 AE 0142	–
		EX●●C13N	VW3 AE 0144	–
		EX●●C16N	VW3 AE 0145	4.000
		EX●●C20N	VW3 AE 0146	1.400
		EX●●C25N	VW3 AE 0147	1.400
		EX●●C31N	VW3 AE 0148	1.400
		EX●●C40N	VW3 AE 0150	–
		EX●●C50N	VW3 AE 0151	–
		EX●●C63N	VW3 AE 0152	–
		EXA●C63N	VW3 AE 0169	–
		EXA●C80N, C90N	VW3 AE 0170	–
		EXA●M11N	VW3 AE 0171	–
		EXA●M13N	VW3 AE 0172	–
		EXA●M15N, M18N	VW3 AE 0173	–
690 V		EXC●C11Y, C13Y	VW3 AE 0143	4.000
		EXC●C16Y, C20Y	VW3 AE 0145	4.000
		EXC●C25Y...C40Y	VW3 AE 0147	1.400
		EXC●C50Y, C63Y	VW3 AE 0150	–
		EXC●C80Y	VW3 AE 0151	–
		EXA●C80Y	VW3 AE 0169	–
		EXA●M10Y, M12Y	VW3 AE 0170	–
		EXA●M15Y	VW3 AE 0171	–
		EXA●M18Y	VW3 AE 0172	–
		EXA●M21Y, M24Y	VW3 AE 0173	–

Door handle for circuit breaker



The external door handle enables handling of the switch without opening the enclosure door.

Allocation table

Description		ATV61	Order number	Weight [kg]
Door handle for circuit breaker	400 V	EX●●D90N4...C13N4	VW3 AE 0114	1.000
		EX●●C16N4...C25N4	VW3 AE 0115	2.000
		EX●●C31N4...C63N4	VW3 AE 0116	2.000
		EXA●C63N4, C71N4	VW3 AE 0116	2.000
		EXA●C90N4 ... M14N4	-	-
500 V		EX●●C11N...C13N	VW3 AE 0114	1.000
		EX●●C16N...C31N	VW3 AE 0115	2.000
		EX●●C40N...C63N	VW3 AE 0116	2.000
		EXA●C63N...C90N	VW3 AE 0116	2.000
		EXA●M11N...M18N	-	-
690 V		EX●●C11Y...C40Y	VW3 AE 0115	2.000
		EX●●C50Y, C63Y	VW3 AE 0116	2.000
		EXA●C80Y, M12Y	VW3 AE 0116	2.000
		EXA●M15Y ... M24Y	-	-

Undervoltage coil 230V

When there is no voltage at the undervoltage coil, the circuit breaker switches off.

Allocation table

Description		ATV61	Order number	Weight [kg]
Undervoltage coil 230V	400 V	EX●●D90N4...C25N4	VW3 AE 0117	0.500
		EX●●C31N4...C63N4	VW3 AE 0118	0.500
		EXA●C63N4...M14N4	VW3 AE 0118	0.500
500 V		EX●●C90N...C40N	VW3 AE 0117	0.500
		EX●●C50N...C63N	VW3 AE 0118	0.500
		EXA●C63N...M18N	VW3 AE 0118	0.500
690 V		EX●●C11Y...C63Y	VW3 AE 0117	0.500
		EX●●C80Y	VW3 AE 0118	0.500
		EXA●C80Y...M24Y	VW3 AE 0118	0.500

Undervoltage coil 110V

When there is no voltage at the undervoltage coil, the circuit breaker switches off.

Allocation table

Description	ATV61	Order number	Weight [kg]	
Undervoltage coil 110V	400 V	EX●●D90N4...C25N4	VW3 AE 0119	0.500
		EX●●C31N4...C63N4	VW3 AE 0120	0.500
		EXA●C63N4...M14N4	VW3 AE 0120	0.500
	500 V	EX●●C90N...C40N	VW3 AE 0119	0.500
		EX●●C50N...C63N	VW3 AE 0120	0.500
		EXA●C63N...M18N	VW3 AE 0120	0.500
	690 V	EX●●C11Y...C63Y	VW3 AE 0119	0.500
		EX●●C80Y	VW3 AE 0120	0.500
		EXA●C80Y...M24Y	VW3 AE 0120	0.500

230V motor for circuit breaker

Remote control of the circuit breaker via control commands is possible by means of this motor drive.

Allocation table

Description	ATV61	Order number	Weight [kg]	
230 V motor for circuit breaker	400 V	EX●●D90N4...C13N4	VW3 AE 0121	0.950
		EX●●C16N4	VW3 AE 0122	3.000
		EX●●C22N4, C25N4	VW3 AE 0123	3.000
		EX●●C31N4, C40N4	VW3 AE 0124	7.000
		EX●●C50N4	VW3 AE 0125	7.000
		EX●●C63N4	VW3 AE 0126	7.000
		EXA●C63N4, C71N4	VW3 AE 0126	7.000
		EXA●C90N4...M14N4	-	-
	500 V	EX●●D90N	VW3 AE 0154	1.000
		EX●●C11N, C13N	VW3 AE 0155	1.000
		EX●●C16N, C20N	VW3 AE 0156	3.000
		EX●●C25N, C31N	VW3 AE 0157	3.000
		EX●●C40N	VW3 AE 0158	7.000
		EX●●C50N, C63N	VW3 AE 0159	7.000
		EXA●C63N	VW3 AE 0176	7.000
		EXA●C80N, C90N	VW3 AE 0177	7.000
		EXA●M11N...M18N	-	-
		690 V	EX●●C11Y...C20Y	VW3 AE 0156
	EX●●C25Y...C40Y		VW3 AE 0157	3.000
	EX●●C50Y, C63Y		VW3 AE 0158	7.000
	EX●●C80Y		VW3 AE 0159	7.000
EXA●C80Y	VW3 AE 0176		7.000	
EXA●M10Y, M12Y	VW3 AE 0177		7.000	
EXA●M15Y...M24Y	-	-		

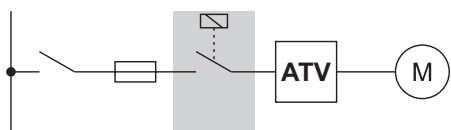
110V motor for circuit breaker

Remote control of the circuit breaker via control commands is possible by means of this motor drive.

Allocation table

Description		ATV61	Order number	Weight [kg]
110 V motor for circuit breaker	400 V	EX●●D90N4...C13N4	VW3 AE 0127	0.950
		EX●●C16N4	VW3 AE 0128	3.000
		EX●●C22N4, C25N4	VW3 AE 0129	3.000
		EX●●C31N4, C40N4	VW3 AE 0130	7.000
		EX●●C50N4	VW3 AE 0131	7.000
		EX●●C63N4	VW3 AE 0132	7.000
		EXA●C63N4...C71N4	VW3 AE 0132	7.000
		EXA●C90N4...M14N4	–	–
500 V		EX●●D90N	VW3 AE 0160	1.000
		EX●●C11N, C13N	VW3 AE 0161	1.000
		EX●●C16N, C20N	VW3 AE 0162	3.000
		EX●●C25N, C31N	VW3 AE 0163	3.000
		EX●●C40N	VW3 AE 0164	7.000
		EX●●C50N, C63N	VW3 AE 0165	7.000
		EXA●C63N	VW3 AE 0179	7.000
		EXA●C80N, C90N	VW3 AE 0180	7.000
	EXA●M11N...M18N	–	–	
690 V		EX●●C11Y...C20Y	VW3 AE 0162	3.000
		EX●●C25Y...C40Y	VW3 AE 0163	3.000
		EX●●C50Y, C63Y	VW3 AE 0164	7.000
		EX●●C80Y	VW3 AE 0165	7.000
		EXA●C80Y	VW3 AE 0179	7.000
		EXA●M10Y, M12Y	VW3 AE 0180	7.000
	EXA●M15Y...M24Y	–	–	

Line contactor



By using this option, the frequency inverter is able to connect or disconnect itself from the mains by using the function "line contactor control" in combination with a logic output.

This option includes the line contactor and an auxiliary relay to switch the contactor.



More information on the function "line contactor control" can be found in the programming manual.



This option requires a 230 V AC supply. See chapter "Supply voltage 230 V AC", page 156 for further information.



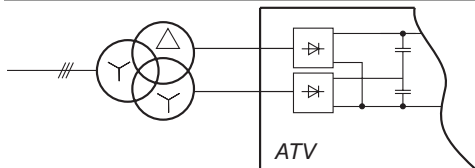
An additional power supply for the 24 V DC buffer voltage will be necessary, when the line contactor has to be controlled by the inverter using the function "line contactor control". See chapter "Buffer voltage 24 V DC", page 157 for further information.

Allocation table

Description	ATV61	Order number	Weight [kg]	
Line contactor	400 V	EX●●D90N4	VW3 AE 0206	7.000
	EX●●C11N4	VW3 AE 0207	7.000	
	EX●●C13N4	VW3 AE 0218	10.000	
	EX●●C16N4	VW3 AE 0208	11.000	
	EXC●C22N4	VW3 AE 0209	12.000	
	EXS5C22N4...C31N4	VW3 AE 0216	10.000	
	EXC●C25N4	VW3 AE 0210	14.000	
	EXC●C31N4	VW3 AE 0211	21.000	
	EX●●C40N4	VW3 AE 0211	21.000	
	EX●●C50N4	VW3 AE 0213	28.000	
	EX●●C63N4	VW3 AE 0214	42.000	
	EXA●C63N4, C71N4	VW3 AE 0227 *	42.000	
	EXA●C90N4	VW3 AE 0224	84.000	
	EXA●M11N4, M13N4	VW3 AE 0224	84.000	
	EXA●M14N4	VW3 AE 0224	84.000	
	500 V	EX●●D90N	VW3 AE 0205	4.000
		EX●●C11N	VW3 AE 0206	7.000
EX●●C13N, C16N		VW3 AE 0218	10.000	
EX●●C20N		VW3 AE 0209	12.000	
EX●●C25N, C31N		VW3 AE 0210	14.000	
EX●●C40N		VW3 AE 0212	24.000	
EX●●C50N, C63N		VW3 AE 0213	28.000	
EXA●C63N...C90N		VW3 AE 0227 *	42.000	
EXA●M11N		VW3 AE 0226	84.000	
EXA●M13N, M15N		VW3 AE 0226	84.000	
EXA●M18N		VW3 AE 0226	84.000	
690 V		EX●●C11Y...C16Y	VW3 AE 0218	10.000
	EX●●C20Y	VW3 AE 0208	11.000	
	EX●●C25Y	VW3 AE 0209	12.000	
	EX●●C31Y	VW3 AE 0210	14.000	
	EX●●C40Y	VW3 AE 0211	21.000	
	EX●●C50Y	VW3 AE 0212	24.000	
	EX●●C63Y, C80Y	VW3 AE 0213	28.000	
	EXA●C80Y...M12Y	VW3 AE 0227 *	42.000	
	EXA●M15Y	VW3 AE 0226	84.000	
	EXA●M18Y, M21Y	VW3 AE 0226	84.000	
	EXA●M24Y	VW3 AE 0226	84.000	

*When this option is used together with a line reactor, the option VW3 AE 0225 (50.000 kg) must be ordered additionally!

12-pulse supply



When choosing this option the inverter is prepared for 12-pulse supply. Instead of the 3-pole main switch a 6-pole main switch is used.



As the door handle is always outside the enclosure at this option, the option "Door handle for main switch" is not permitted.



At 12-pulse design, the options "cable entry via top" and "circuit breaker" are only available on request.

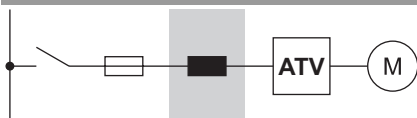


Further information is given in chapter "12-pulse supply", page 23).

Allocation table for options depending on the power

Description		ATV61	Order number	Weight [kg]
12-pulse supply	400 V	EXA•C63N4, C71N4	VW3 AE 2416	-
		EXA•C90N4	VW3 AE 2418	-
		EXA•M11N4	VW3 AE 2419	-
		EXA•M13N4, M14N4	VW3 AE 2420	-
	500 V	EXA•C63N	VW3 AE 2415	-
		EXA•C80N, C90N	VW3 AE 2416	-
		EXA•M11N	VW3 AE 2418	-
		EXA•M13N	VW3 AE 2419	-
		EXA•M15N, M18N	VW3 AE 2420	-
	690 V	EXA•C80Y	VW3 AE 2415	-
		EXA•M10Y, M12Y	VW3 AE 2416	-
		EXA•M15Y	VW3 AE 2418	-
EXA•M18Y		VW3 AE 2419	-	
EXA•M21Y, M24Y		VW3 AE 2420	-	

Line reactor



The option line reactor can be used for reduction of the mains current harmonics.

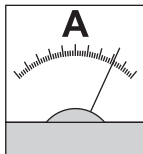


When a transformer with matching power is used, the line reactor can be omitted. See also chapter "12-pulse supply", page 23.

Allocation table

Description		ATV61	Order number	Weight [kg]
Line reactor	400 V	EXA•C63N4, C71N4	VW3 AE 2501	132.000
		EXA•C90N4	VW3 AE 2502	202.000
		EXA•M11N4...M14N4	VW3 AE 2503	264.000
	500 V	EXA•C63N	VW3 AE 2504	154.000
		EXA•C80N	VW3 AE 2505	121.000
		EXA•C90N	VW3 AE 2506	136.000
		EXA•M11N	VW3 AE 2507	388.000
		EXA•M13N, M15N	VW3 AE 2508	322.000
		EXA•M18N	VW3 AE 2509	353.000
	690 V	EXA•C80Y	VW3 AE 2504	154.000
		EXA•M10Y	VW3 AE 2505	121.000
		EXA•M12Y	VW3 AE 2506	136.000
		EXA•M15Y	VW3 AE 2507	388.000
		EXA•M18Y, M21Y	VW3 AE 2508	322.000
		EXA•M24Y	VW3 AE 2509	353.000

Amperemeter „Line current“



This option indicates the line current. It includes a measuring instrument built into the enclosure door and a current transformer.

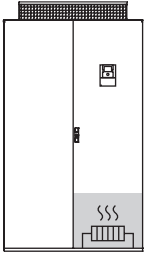


In case of 12-pulse supply one ammeter is built-in in each supply line.


Allocation table

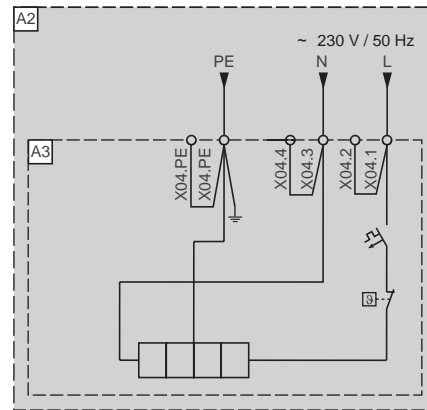
Description	ATV61	Order number	Weight [kg]	
Ammeter	400 V	EX●●D90N4	VW3 AE 0404	0.200
		EX●●C11N4...C16N4	VW3 AE 0406	0.200
		EX●●C22N4, C25N4	VW3 AE 0426	0.200
		EX●●C31N4, C40N4	VW3 AE 0409	0.200
		EX●●C50N4	VW3 AE 0427	0.200
		EX●●C63N4	VW3 AE 0411	0.200
		EXA●C63N4, C71N4	VW3 AE 0411 (6p) VW3 AE 0421 (12p)	0.200
		EXA●C90N4	VW3 AE 0413 (6p) VW3 AE 0421 (12p)	0.200
		EXA●M11N4	VW3 AE 0414 (6p) VW3 AE 0429 (12p)	0.200
	EXA●M13N4, M14N4	VW3 AE 0415 (6p) VW3 AE 0423 (12p)	0.200	
	500 V	EX●●D90N, C11N	VW3 AE 0404	0.200
		EX●●C13N...C20N	VW3 AE 0406	0.200
		EX●●C25N, C31N	VW3 AE 0426	0.200
		EX●●C40N	VW3 AE 0409	0.200
		EX●●C50N	VW3 AE 0409	0.200
		EX●●C63N	VW3 AE 0427	0.200
		EXA●C63N	VW3 AE 0427 (6p) VW3 AE 0428 (12p)	0.200
		EXA●C80N, C90N	VW3 AE 0411 (6p) VW3 AE 0421 (12p)	0.200
		EXA●M11N	VW3 AE 0413 (6p) VW3 AE 0421 (12p)	0.200
EXA●M13N, M15N		VW3 AE 0414 (6p) VW3 AE 0429 (12p)	0.200	
EXA●M18N	VW3 AE 0415 (6p) VW3 AE 0423 (12p)	0.200		
690 V	EX●●C11Y...C16Y	VW3 AE 0404	0.200	
	EX●●C20Y...C31Y	VW3 AE 0406	0.200	
	EX●●C40Y	VW3 AE 0426	0.200	
	EX●●C50Y, C63Y	VW3 AE 0409	0.200	
	EX●●C80Y	VW3 AE 0409	0.200	
	EXA●C80Y	VW3 AE 0409 (6p) VW3 AE 0428 (12p)	0.200	
	EXA●M10Y, M12Y	VW3 AE 0411 (6p) VW3 AE 0421 (12p)	0.200	
	EXA●M15Y	VW3 AE 0413 (6p) VW3 AE 0421 (12p)	0.200	
	EXA●M18Y, M21Y	VW3 AE 0414 (6p) VW3 AE 0429 (12p)	0.200	
	EXA●M24Y	VW3 AE 0415 (6p) VW3 AE 0423 (12p)	0.200	

Cubicle heating



This option is used to heat the enclosure in order to avoid frost and condensation up to an ambient temperature of -10°C. It includes the enclosure heating, a thermostat and a circuit breaker. The option is wired to the customer terminals X04 (max. cable cross section: 4 mm²).

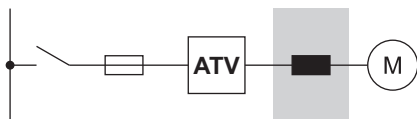
 To guarantee an operation after mains off, an additional external 230 V supply (500...1500 VA, depending on option) will be necessary! This supply has to be human protected!



Allocation table

Description		ATV61	Order number	Weight [kg]
Enclosure heater	400 V	EX●●D90N4...C31N4	VW3 AE 0501	0.500
		EX●●C40N4...C63N4	VW3 AE 0502	1.000
		EXA●C63N4...C71N4	VW3 AE 0502	1.000
		EXA●C90N4...M14N4	VW3 AE 0503	1.500
	500 V	EX●●D90N...C31N	VW3 AE 0501	0.500
		EX●●C40N...C63N	VW3 AE 0502	1.000
		EXA●C63N...C90N	VW3 AE 0502	1.000
		EXA●M11N...M18N	VW3 AE 0503	1.500
	690 V	EX●●C11Y...C40Y	VW3 AE 0501	0.500
		EX●●C50Y...C80Y	VW3 AE 0502	1.000
		EXA●C80Y...M12Y	VW3 AE 0502	1.000
		EXA●M15Y...M24Y	VW3 AE 0503	1.500

Motor choke



At the output of a voltage source frequency inverter there is a pulsed voltage with a pulse frequency of 2...16 kHz (ATV61EX●●●●N, Y: 2...6 kHz) and a slew rate of more than 10 kV/μs.

The use of the option motor choke has significant advantages concerning the trouble-free operation of the drive:

- Decrease of the voltage load of the motor –recommended from 50 m, necessary from 100 m for 400 V mains supply
10 m, necessary from 30 m for 690 V mains supply
- Prevention of common mode bearing currents in the motor – especially important at high power
- Great reduction of the influences to other cables – important if the separate laying of motor cables cannot be ensured

By means of the especially developed system the voltage drop at the motor choke is negligible small.



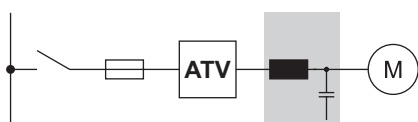
This option cannot be combined with the option sinus filter!

Allocation table

Description	ATV61	Order number	Weight [kg]	
Motor choke	400 V			
	EXC●D90N4	VW3 AE 0603	17.000	
	EXS5D90N4	VW3 AE 0615	37.000	
	EXC●C11N4, C13N4	VW3 AE 0604	35.000	
	EXS5C11N4	VW3 AE 0616	55.000	
	EXS5C13N4	VW3 AE 0617	55.000	
	EXC●C16N4, C22N4	VW3 AE 0605	64.000	
	EXS5C16N4	VW3 AE 0618	154.000	
	EXS5C22N4	VW3 AE 0619	157.000	
	EXC●C25N4, C31N4	VW3 AE 0606	102.000	
	EXS5C25N4, C31N4	VW3 AE 0621	192.000	
	EXC2C40N4	VW3 AE 0608	222.000	
	EXC5C40N4	VW3 AE 0612	222.000	
	EXS5C40N4	VW3 AE 0623	222.000	
	EXC2C50N4	VW3 AE 0609	228.000	
	EXC5C50N4	VW3 AE 0613	228.000	
	EXS5C50N4	VW3 AE 0624	228.000	
	EXC2C63N4	VW3 AE 0610	234.000	
	EXC5C63N4	VW3 AE 0614	234.000	
	EXS5C63N4	VW3 AE 0625	234.000	
	EXA●C63N4...C71N4	VW3 AE 0635	132.000	
	EXA●C90N4...M14N4	VW3 AE 0636	264.000	
	500 V	EX●●D90N, C11N	VW3 AE 0603	17.000
		EX●●C13N, C16N	VW3 AE 0604	35.000
EX●●C20N, C25N		VW3 AE 0605	64.000	
EX●●C31N		VW3 AE 0606	102.000	
EXC2C40N		VW3 AE 0626	192.000	
EXC5C40N		VW3 AE 0628	192.000	
EXS5C40N		VW3 AE 0630	197.000	
EXC2C50N, C63N		VW3 AE 0627	234.000	
EXC5C50N, C63N		VW3 AE 0629	234.000	
EXS5C50N, C63N		VW3 AE 0631	234.000	
EXA●C63N...C90N		VW3 AE 0635	132.000	
EXA●M11N...M18N		VW3 AE 0636	264.000	

690 V			
	EX●●C11Y, C13Y	VW3 AE 0603	17.000
	EX●●C16Y, C20Y	VW3 AE 0604	35.000
	EX●●C25Y, C31Y	VW3 AE 0605	64.000
	EX●●C40Y	VW3 AE 0606	102.000
	EXC2C50Y	VW3 AE 0626	192.000
	EXC5C50Y	VW3 AE 0628	192.000
	EXS5C50Y	VW3 AE 0630	197.000
	EXC2C63Y, C80Y	VW3 AE 0627	234.000
	EXC5C63Y, C80Y	VW3 AE 0629	234.000
	EXS5C63Y, C80Y	VW3 AE 0631	234.000
	EXA●C80Y...M12Y	VW3 AE 0635	132.000
	EXA●M15Y...M24Y	VW3 AE 0636	264.000

Sinus filter



This option permits nearly sinusoidal motor voltage. Therefore, additional noises at the motor are totally prevented. The sinus filter can be also used alternatively to the option motor choke.



This option cannot be combined with the option sinus filter or option cable entry via the top!

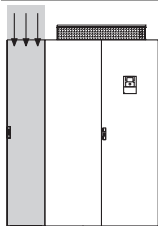


The maximum operating frequency of the sinus filters is 100 Hz!

Allocation table

Description	ATV61	Order number	Weight [kg]
Sinus filter	400 V		
	EXC2D90N4, C11N4	VW3 AE 0641	318.000
	EXC5D90N4, C11N4	VW3 AE 0653	348.000
	EXS5D90N4, C11N4	VW3 AE 0665	318.000
	EXC2C13N4	VW3 AE 0643	357.000
	EXC5C13N4	VW3 AE 0655	357.000
	EXS5C13N4	VW3 AE 0667	357.000
	EXC2C16N4	VW3 AE 0644	365.000
	EXC5C16N4	VW3 AE 0656	365.000
	EXS5C16N4	VW3 AE 0668	365.000
	EXC2C22N4	VW3 AE 0646	384.000
	EXC5C22N4	VW3 AE 0658	384.000
	EXS5C22N4	VW3 AE 0670	384.000
	EXC2C25N4, C31N4	VW3 AE 0648	434.000
	EXC5C25N4, C31N4	VW3 AE 0660	434.000
	EXS5C25N4, C31N4	VW3 AE 0672	434.000
	EXC2C40N4	VW3 AE 0650	870.000
	EXC5C40N4	VW3 AE 0662	870.000
	EXS5C40N4	VW3 AE 0674	870.000
	EXC2C50N4	VW3 AE 0651	870.000
	EXC5C50N4	VW3 AE 0663	900.000
	EXS5C50N4	VW3 AE 0675	900.000
	EXC2C63N4	VW3 AE 0652	900.000
	EXC5C63N4	VW3 AE 0664	930.000
	EXS5C63N4	VW3 AE 0676	930.000

Cable entry via the top



This option allows the connection of the mains and motor cables from the top of the enclosure.

☞ For 12-pulse supply the option "Cable entry via top" is only available on request.

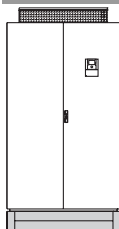
☞ For the width of the enclosure in combination with the cable entry via top check out the table in chapter "Width of the cubicle", page 179.

Allocation table

Description			ATV61	Order number	Weight [kg]		
Cable entry via the top	400 V	Without motor choke	EXC•D90N4...C13N4	VW3 AE 0705	108.000		
			EXS5D90N4...C13N4	VW3 AE 0715	123.000		
			EXC•C16N4	VW3 AE 0706	108.000		
			EXS5C16N4	VW3 AE 0727	123.000		
			EXC•C22N4	VW3 AE 0707	108.000		
			EXS5C22N4	VW3 AE 0717	123.000		
			EXC•C25N4, C31N4	VW3 AE 0708	126.000		
			EXS5C25N4, C31N4	VW3 AE 0718	141.000		
		EXC•C40N4	VW3 AE 0709	216.000			
		EXS5C40N4	VW3 AE 0719	123.000			
		EXC•C50N4	VW3 AE 0710	252.000			
		EXS5C50N4	VW3 AE 0720	141.000			
		EXC•C63N4	VW3 AE 0711	252.000			
		EXS5C63N4	VW3 AE 0721	141.000			
		EXA•C63N4...C71N4	VW3 AE 0740	126.000			
		EXA•C90N4...M14N4	VW3 AE 0741	150.000			
	With motor choke	400 V	With motor choke	EXC•D90N4...C13N4	VW3 AE 0705	108.000	
				EXS5D90N4...C13N4	VW3 AE 0715	123.000	
				EXC•C16N4	VW3 AE 0706	108.000	
				EXS5C16N4	VW3 AE 0727	123.000	
				EXC•C22N4	VW3 AE 0707	108.000	
				EXS5C22N4	VW3 AE 0722	123.000	
				EXC•C25N4, C31N4	VW3 AE 0708	126.000	
				EXS5C25N4, C31N4	VW3 AE 0723	141.000	
				EXC•C40N4	VW3 AE 0712	108.000	
				EXS5C40N4	VW3 AE 0724	–	
				EXC•C50N4	VW3 AE 0713	126.000	
				EXS5C50N4	VW3 AE 0725	–	
				EXC•C63N4	VW3 AE 0714	126.000	
				EXS5C63N4	VW3 AE 0726	–	
				EXA•C63N4...C71N4	VW3 AE 0740	126.000	
				EXA•C90N4...M14N4	VW3 AE 0741	150.000	
500 V	Without motor choke	Without motor choke	EXC•D90N...C16N	VW3 AE 0728	108.000		
			EXS5D90N...C16N	VW3 AE 0732	–		
			EXC•C20N...C31N	VW3 AE 0729	126.000		
			EXS5C20N...C31N	VW3 AE 0733	–		
			EXC•C40N...C63N	VW3 AE 0730	252.000		
			EXS5C40N...C63N	VW3 AE 0734	252.000		
			EXA•C63N...C90N	VW3 AE 0740	126.000		
			EXA•M11N...M18N	VW3 AE 0741	150.000		
	With motor choke		500 V	With motor choke	EXC•D90N...C16N	VW3 AE 0728	108.000
					EXS5D90N...C16N	VW3 AE 0735	108.000
					EXC•C20N...C31N	VW3 AE 0729	126.000
					EXS5C20N...C31N	VW3 AE 0736	126.000
					EXC•C40N...C63N	VW3 AE 0731	126.000
					EXS5C40N...C63N	VW3 AE 0737	252.000
					EXA•C63N...C90N	VW3 AE 0740	126.000
					EXA•M11N...M18N	VW3 AE 0741	150.000

Allocation table						
Description			ATV61	Order number	Weight [kg]	
690 V	Without motor choke		EXC•C11Y...C20Y	VW3 AE 0728	108.000	
			EXS5C11Y...C20Y	VW3 AE 0732	–	
			EXC•C25Y...C40Y	VW3 AE 0729	126.000	
			EXS5C25Y...C40Y	VW3 AE 0733	–	
			EXC•C50Y...C80Y	VW3 AE 0730	252.000	
			EXS5C50Y...C80Y	VW3 AE 0734	252.000	
			EXA•C80Y...M12Y	VW3 AE 0740	126.000	
			EXA•M15Y...M24Y	VW3 AE 0741	150.000	
		With motor choke		EXC•C11Y...C20Y	VW3 AE 0728	108.000
				EXS5C11Y...C20Y	VW3 AE 0735	108.000
			EXC•C25Y...C40Y	VW3 AE 0729	126.000	
			EXS5C25Y...C40Y	VW3 AE 0736	126.000	
			EXC•C50Y...C80Y	VW3 AE 0731	126.000	
			EXS5C50Y...C80Y	VW3 AE 0737	252.000	
			EXA•C80Y...M12Y	VW3 AE 0740	126.000	
			EXA•M15Y...M24Y	VW3 AE 0741	150.000	

Cubicle plinth 200 mm



There are different additional plinths for the Altivar in IP23 or IP54 design available. Which plinth is necessary depends on the built-in options of the ATV61. Check out the allocation table below. The height of the enclosure will increase of 200 mm.



The ATV61 in IP54 design with separated air flow is delivered with a plinth as standard.

Allocation table					
Description			ATV61	Order number	Weight [kg]
Enclosure plinth	400 V	Without motor choke	EXC•D90N4...C22N4	VW3 AE 0801	11.000
			EXC•C25N4, C31N4	VW3 AE 0802	13.000
			EXC•C40N4, C50N4	VW3 AE 0803	15.000
			EXC•C63N4	VW3 AE 0804	17.000
			EXA•C63N4...C71N4	VW3 AE 0820 **	38.000
			EXA•C90N4...M14N4	VW3 AE 0822	69.000
			With motor choke	EXC•D90N4...C22N4	VW3 AE 0801
	EXC•C25N4, C31N4	VW3 AE 0802		13.000	
	EXC•C40N4, C50N4	VW3 AE 0805		24.000	
	EXC•C63N4	VW3 AE 0806		26.000	
	EXA•C63N4...C71N4	VW3 AE 0820 **		38.000	
	EXA•C90N4...M14N4	VW3 AE 0822		69.000	
	with line reactor	EXA•C63N4...C71N4		VW3 AE 0820 **	38.000
		EXA•C90N4...M14N4	VW3 AE 0824	78.000	
Additional enclosure plinth for cable entry via the top	Without motor choke		EXC•D90N4...C31N4	VW3 AE 0807	9.000
			EXC•C40N4...C63N4	VW3 AE 0808	18.000
			EXA•C63N4...C71N4	VW3 AE 0825	9.000
			EXA•C90N4...M14N4	VW3 AE 0826	11.000
	With motor choke		EXC•D90N4...C31N4	VW3 AE 0807	9.000
			EXC•C40N4...C63N4	VW3 AE 0809	9.000
			EXA•C63N4...C71N4	VW3 AE 0825	9.000
			EXA•C90N4...M14N4	VW3 AE 0826	11.000
Additional enclosure plinth For braking unit			EXC•C25N4, C31N4	– *	–
			EXC•C40N4...C63N4	VW3 AE 0810	9.000
Additional enclosure plinth for sinus filter			EXC•D90N4...C31N4	VW3 AE 0816	11.000
			EXC•C40N4...C63N4	VW3 AE 0817	13.000

Cubicle options (depending on power)

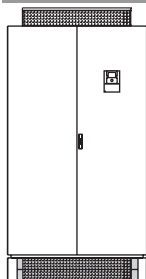
Altivar 61 Plus Options

Allocation table								
Description			ATV61	Order number	Weight [kg]			
Enclosure plinth	500 V	No option	EXC●D90N...C16N	VW3 AE 0801	11.000			
			EXC●C20N...C31N	VW3 AE 0802	13.000			
			EXC●C40N...C63N	VW3 AE 0804	17.000			
			EXA●C63N...C90N	VW3 AE 0820 **	38.000			
			EXA●M11N...M18N	VW3 AE 0822	69.000			
		With motor choke	EXC●D90N...C16N	VW3 AE 0801	11.000			
			EXC●C20N...C31N	VW3 AE 0802	13.000			
			EXC●C40N...C63N	VW3 AE 0806	26.000			
			EXA●C63N...C90N	VW3 AE 0820 **	38.000			
			EXA●M11N...M18N	VW3 AE 0822	69.000			
		with line reactor	EXA●C63N...C90N	VW3 AE 0820 **	38.000			
			EXA●M11N...M18N	VW3 AE 0824	78.000			
		Additional enclosure plinth for cable entry via the top		Without motor choke	EXC●D90N...C31N	VW3 AE 0807	9.000	
					EXC●C40N...C63N	VW3 AE 0808	18.000	
					EXA●C63N...C90N	VW3 AE 0825	9.000	
EXA●M11N...M18N	VW3 AE 0826				11.000			
With motor choke	EXC●D90N...C31N			VW3 AE 0807	9.000			
	EXC●C40N...C63N			VW3 AE 0809	9.000			
	EXA●C63N...C90N			VW3 AE 0825	9.000			
	EXA●M11N...M18N			VW3 AE 0826	11.000			
	Additional enclosure plinth for braking unit			EXC●C20N...C63N	VW3 AE 0810	9.000		
	Enclosure plinth			690 V	No option	EXC●C11Y...C20Y	VW3 AE 0801	11.000
EXC●C25Y...C40Y		VW3 AE 0802	13.000					
EXC●C50Y...C80Y		VW3 AE 0804	17.000					
EXA●C80Y...M12Y		VW3 AE 0820 **	38.000					
EXA●M15Y...M24Y		VW3 AE 0822	69.000					
With motor choke		EXC●C11Y...C20Y	VW3 AE 0801		11.000			
		EXC●C25Y...C40Y	VW3 AE 0802		13.000			
		EXC●C50Y...C80Y	VW3 AE 0806		26.000			
		EXA●C80Y...M12Y	VW3 AE 0820 **		38.000			
		EXA●M15Y...M24Y	VW3 AE 0822		69.000			
with line reactor		EXA●C80Y...M12Y	VW3 AE 0820 **		38.000			
		EXA●M15Y...M24Y	VW3 AE 0824		78.000			
Additional enclosure plinth for cable entry via the top			Without motor choke		EXC●C11Y...C40Y	VW3 AE 0807	9.000	
					EXC●C50Y...C80Y	VW3 AE 0808	18.000	
					EXA●C80Y...M12Y	VW3 AE 0825	9.000	
	EXA●M15Y...M24Y			VW3 AE 0826	11.000			
	With motor choke		EXC●C11Y...C40Y	VW3 AE 0807	9.000			
			EXC●C50Y...C80Y	VW3 AE 0809	9.000			
			EXA●C80Y...M12Y	VW3 AE 0825	9.000			
			EXA●M15Y...M24Y	VW3 AE 0826	11.000			
			Additional enclosure plinth for braking unit			EXC●C25Y...C80Y	VW3 AE 0810	9.000

*..... Therefore is no extra enclosure plinth necessary.

**..... When using a line reactor and line contactor, the option VW3 AE 0821 (40.000 kg) has to be used instead of the option VW3 AE 0820.

Plinth grill fine



Extra fine grill (2.5 mm diameter) for the plinth of the enclosure.

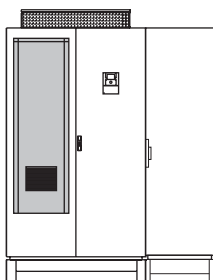


This option is only available for the ATV61 in IP54 with separated air flow !

Allocation table for options depending on the power

Description	ATV61	Order number	Weight [kg]
Plinth equipped with a fine mesh grille 400 V	EXS5D90N4...C22N4	VW3 AE 0812	2.000
	EXS5C25N4, C31N4	VW3 AE 0813	3.000
	EXS5C40N4, C50N4	VW3 AE 0814	4.000
	EXS5C63N4	VW3 AE 0815	5.000
500 V	EXS5D90N...C16N	VW3 AE 0812	2.000
	EXS5C20N...C31N	VW3 AE 0813	3.000
	EXS5C40N...C63N	VW3 AE 0815	5.000
690 V	EXS5C11Y...C20Y	VW3 AE 0812	2.000
	EXS5C25Y...C40Y	VW3 AE 0813	3.000
	EXS5C50Y...C80Y	VW3 AE 0815	5.000

Air condition (for IP54 with separated air flow)



When using this option the cooling of the control part losses in an IP54 cubicle with separated air flow is possible without filter fans. It includes an air condition mounted in the cubicle door and a circuit breaker. The trip relay is assigned to the inverter terminals and will cause in case of an error a trip shut-down of the inverter.



This option affects the depth of the cubicle!
See chapter "Width of the cubicle", page 179 for further details.



This option is only available for the ATV61 in IP54 with separated air flow !



Because of the dimensions of the air condition following options in the enclosure door are not possible for ATV61EXS5D90N4...C31N4, D90N...C31N and C11Y...C40Y devices:

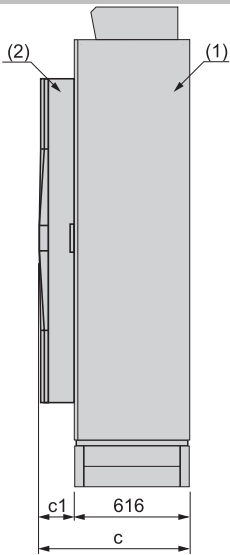
- Ammeter
- Voltmeter
- Emergency stop button (Safe standstill)
- Key switch
- Door handle for circuit breaker
- Isolating handle for switch

Cubicle options (depending on power)

Altivar 61 Plus Options

Allocation table							
Description			ATV61	Order number	Weight [kg]		
Air conditioning	400 V	Without motor choke	EXS5D90N4, C11N4	VW3 AE 0901	29.500		
			EXS5C13N4	VW3 AE 0902	29.500		
			EXS5C16N4	VW3 AE 0903	26.500		
			EXS5C22N4	VW3 AE 0904	56.000		
			EXS5C25N4, C31N4	VW3 AE 0905	71.000		
			EXS5C40N4	VW3 AE 0906	71.000		
			EXS5C50N4	VW3 AE 0907	71.000		
		EXS5C63N4	VW3 AE 0908	86.000			
		With motor choke	EXS5D90N4	VW3 AE 0909	56.000		
			EXS5C11N4	VW3 AE 0910	56.000		
			EXS5C13N4	VW3 AE 0911	56.000		
			EXS5C16N4	VW3 AE 0913	56.000		
			EXS5C22N4	VW3 AE 0914	71.000		
			EXS5C25N4, C31N4	VW3 AE 0915	71.000		
	EXS5C40N4		VW3 AE 0916	71.000			
	500 V	Without motor choke	EXS5D90N...C16N	VW3 AE 0919	56.000		
			EXS5C20N...C31N	VW3 AE 0920	71.000		
			EXS5C40N...C63N	VW3 AE 0921	86.000		
			With motor choke	EXS5D90N...C16N	VW3 AE 0922	71.000	
				EXS5C20N...C31N	VW3 AE 0923	71.000	
				EXS5C40N...C63N	VW3 AE 0924	86.000	
				690 V	Without motor choke	EXS5C11Y...C20Y	VW3 AE 0919
		EXS5C25Y...C40Y				VW3 AE 0920	71.000
		EXS5C50Y...C80Y				VW3 AE 0921	86.000
		With motor choke				EXS5C11Y...C20Y	VW3 AE 0922
			EXS5C25Y...C40Y		VW3 AE 0923	71.000	
			EXS5C50Y...C80Y		VW3 AE 0924	86.000	

Protection degree IP54 with separated air flow and option air condition

Cubicle depth	Order number	c1	c
	VW3 AE 0901	231 mm	847 mm
	VW3 AE 0902	231 mm	847 mm
	VW3 AE 0903	231 mm	847 mm
	VW3 AE 0904	180 mm	796 mm
	VW3 AE 0905	240 mm	856 mm
	VW3 AE 0906	240 mm	856 mm
	VW3 AE 0907	240 mm	856 mm
	VW3 AE 0908	360 mm	976 mm
	VW3 AE 0909	180 mm	796 mm
	VW3 AE 0910	180 mm	796 mm
	VW3 AE 0911	180 mm	796 mm
	VW3 AE 0913	180 mm	796 mm
	VW3 AE 0914	240 mm	856 mm
	VW3 AE 0915	240 mm	856 mm
	VW3 AE 0916	240 mm	856 mm
	VW3 AE 0917	360 mm	976 mm
	VW3 AE 0918	360 mm	976 mm
	VW3 AE 0919	180 mm	796 mm
	VW3 AE 0920	240 mm	856 mm
	VW3 AE 0921	360 mm	976 mm
	VW3 AE 0922	240 mm	856 mm
	VW3 AE 0923	240 mm	856 mm
	VW3 AE 0924	360 mm	976 mm

(1) Standard IP54 enclosure with separated air flow

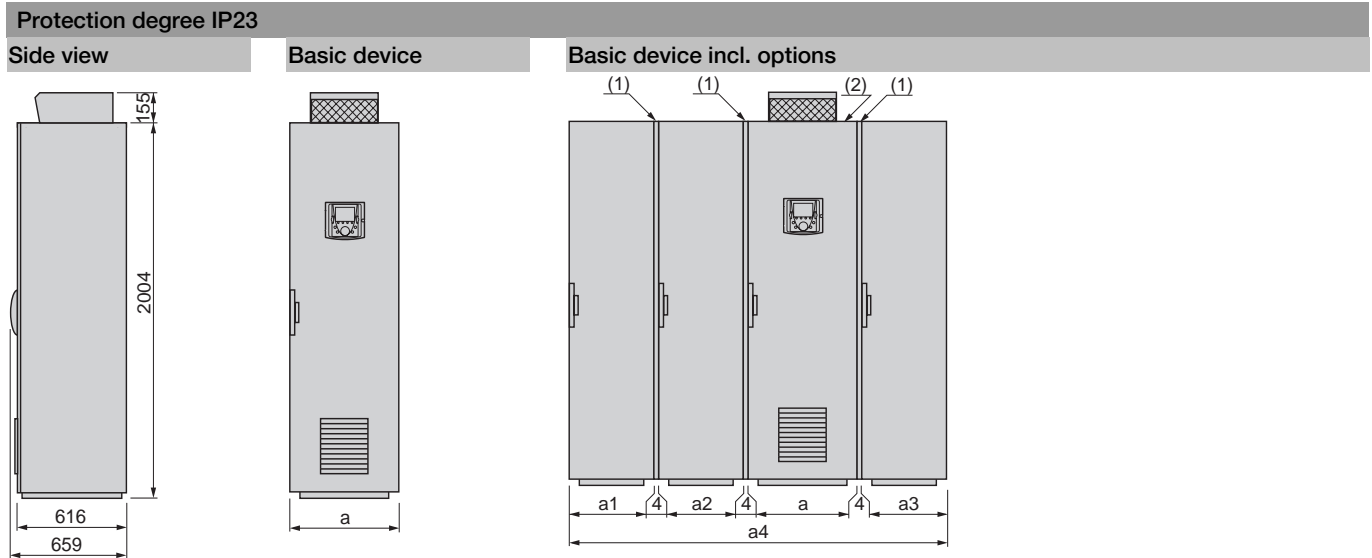
(2) Option air condition

*Cubicle options
(depending on power)*

Altivar 61 Plus

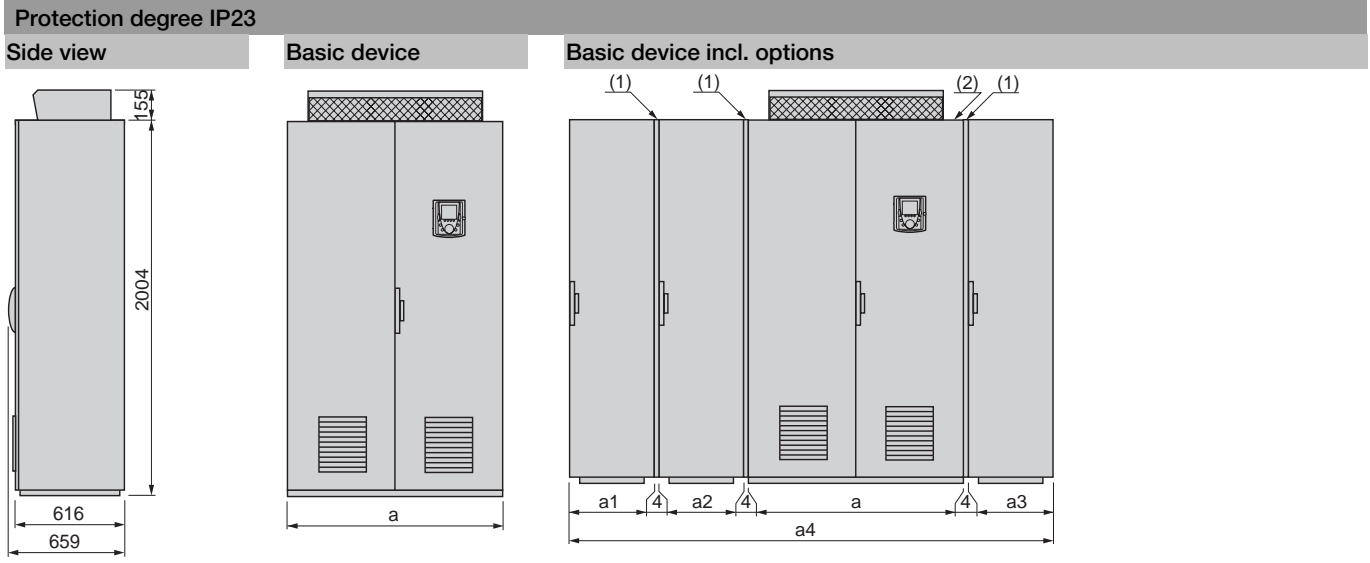
Options

The following tables specify the width of the enclosure that depends on the protection degree and the options used.



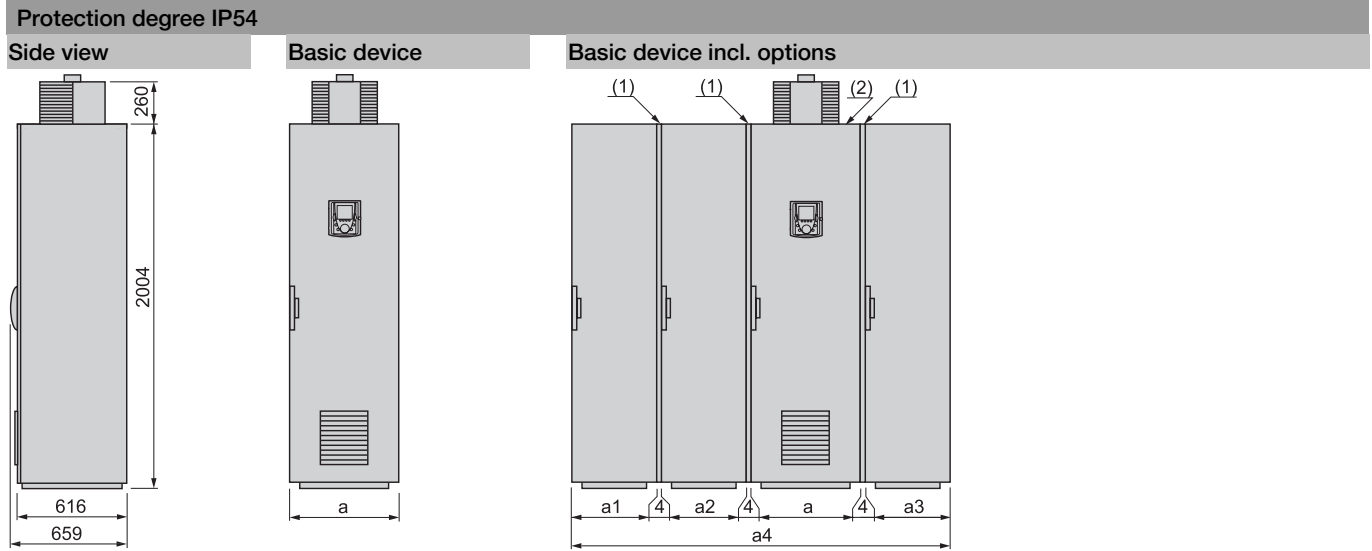
ATV61	Option	a	a1	a2	a3	a4
EXC2D90N4...EXC2C22N4	With or without general options (3) or options depending on the power	616	-	-	-	616
	Cable entry via the top (4)	608	-	408	-	1020
	Sinus filter	608	-	-	608	1220
EXC2C25N4...EXC2C31N4	With or without general options (3) or options depending on the power	816	-	-	-	816
	Cable entry via the top (4)	808	-	408	-	1220
	Sinus filter	808	-	-	608	1420
EXC2D90N...EXC2C16N, EXC2C11Y...EXC2C20Y	With or without general options or options depending on the power	616	-	-	-	616
	Cable entry via the top	608	-	408	-	1020
EXC2C20N...EXC2C31N, EXC2C25Y...EXC2C40Y	With or without general options or options depending on the power	816	-	-	-	816
	Cable entry via the top	808	-	408	-	1220
	Braking unit	808	-	408	-	1220
	Braking unit + cable entry via the top	808	408	400	-	1624

- (1) Seal. For each additional enclosure a 4 mm seal is necessary.
- (2) Standard IP23 enclosure
- (3) Except option "Sinus filter" which needs an additional enclosure.
- (4) Option "cable entry via the top" is not compatible with the option "sinus filter".



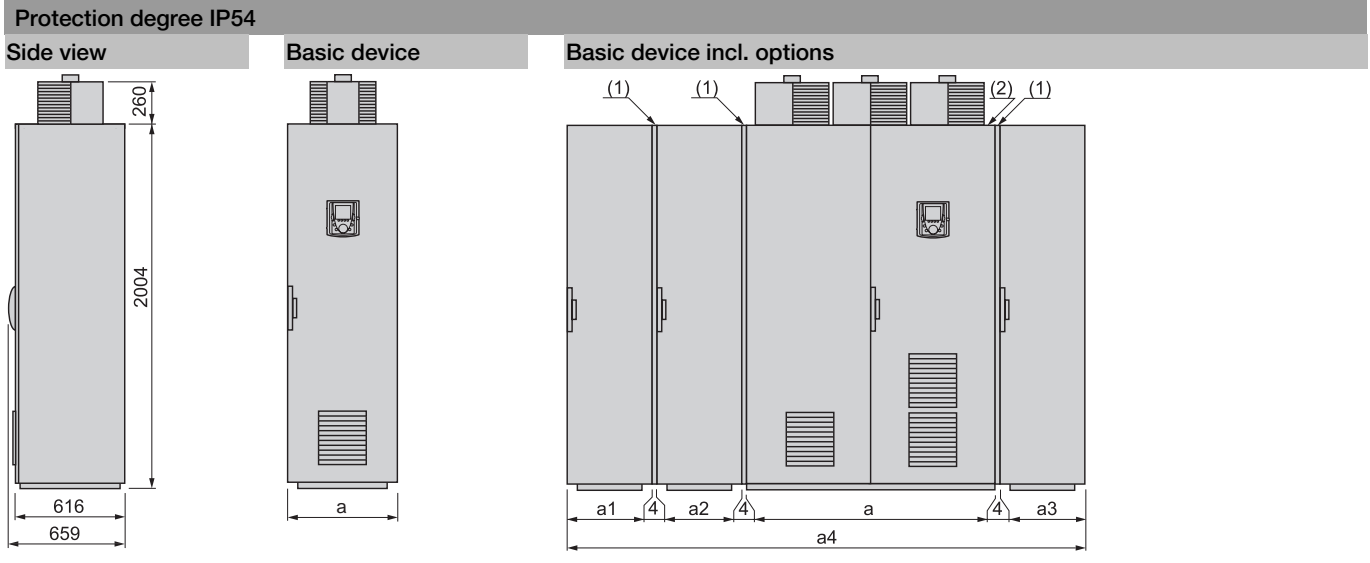
ATV61	Option	a	a1	a2	a3	a4
EXC2C40N4, EXC2C50N4	With or without general options (3) or options depending on the power	1016	-	-	-	1016
	Cable entry via the top (4)	1000	-	408	408	1824
	Braking unit and / or options depending on the power (3)	1008	-	408	-	1420
	Braking unit + cable entry via the top (4)	1000	408	400	408	2228
	Motor choke	1008	-	-	408	1420
	Sinus filter	1008	-	-	808	1820
	Sinus filter + braking unit	1000	-	408	808	2224
EXC2C63N4	With or without general options (3) or options depending on the power	1216	-	-	-	1216
	Cable entry via the top (4)	1200	-	408	408	2024
	Braking unit and / or options depending on the power (3)	1208	-	408	-	1620
	Braking unit + cable entry via the top (4)	1200	408	400	408	2428
	Motor choke	1208	-	-	408	1620
	Sinus filter	1208	-	-	808	2020
	Sinus filter + braking unit	1200	-	408	808	2424
EXC2C40N...EXC2C63N, EXC2C50Y...EXC2C80Y	With or without general options or options depending on the power	1216	-	-	-	1216
	Cable entry via the top	1200	-	408	408	2024
	Braking unit and/or options depending on the power	1208	-	408	-	1620
	Braking unit + cable entry via the top	1200	408	400	408	2428
	Motor choke	1208	-	-	408	1620

- (1) Seal. For each additional enclosure a 4 mm seal is necessary.
- (2) Standard IP23 enclosure
- (3) Except option "Sinus filter" which needs an additional enclosure.
- (4) Option "cable entry via the top" is not compatible with the option "sinus filter".



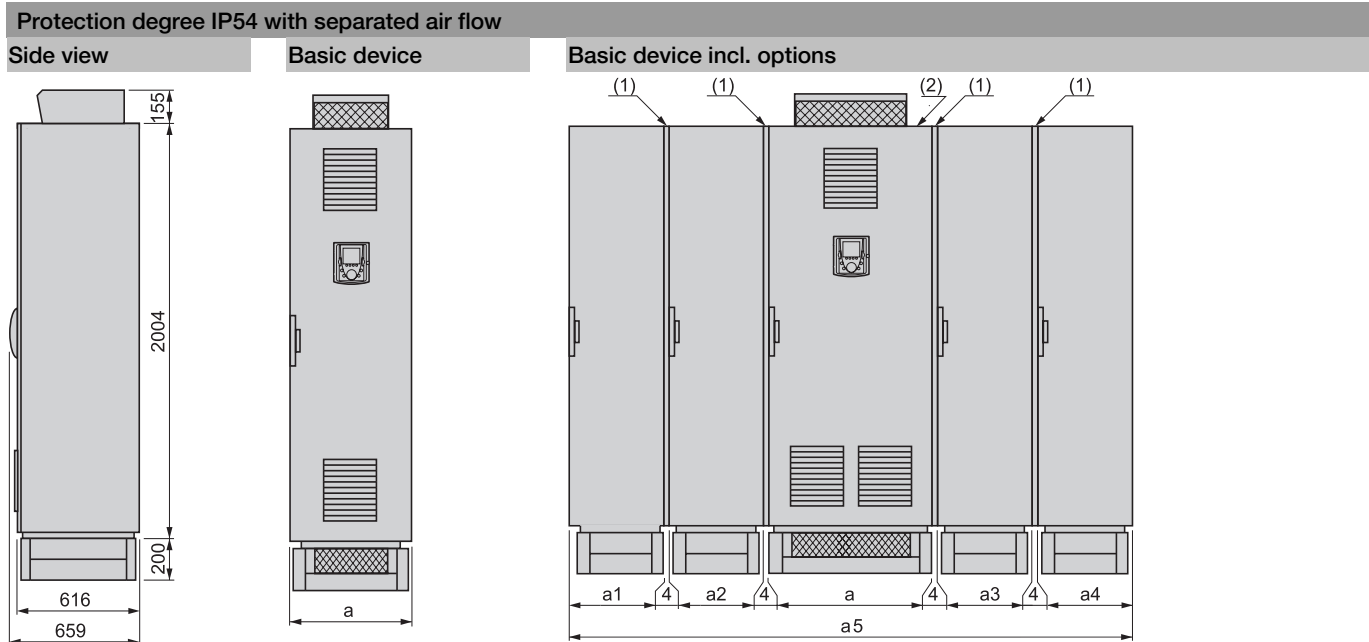
ATV61	Option	a	a1	a2	a3	a4
EXC5D90N4...EXC5C22N4	With or without general options (3) or options depending on the power	616	-	-	-	616
	Cable entry via the top (4)	608	-	408	-	1020
	Sinus filter	608	-	-	608	1220
EXC5C25N4...EXC5C31N4	With or without general options (3) or options depending on the power	816	-	-	-	816
	Cable entry via the top (4)	808	-	408	-	1220
	Sinus filter	808	-	-	608	1420
EXC5D90N...EXC5C16N, EXC5C11Y...EXC5C20Y	With or without general options or options depending on the power	616	-	-	-	616
	Cable entry via the top	608	-	408	-	1020
EXC5C20N...EXC5C31N, EXC5C25Y...EXC5C40Y	With or without general options or options depending on the power	816	-	-	-	816
	Cable entry via the top	808	-	408	-	1220
	Braking unit	808	-	408	-	1220
	Braking unit + cable entry via the top	808	408	400	-	1624

- (1) Seal. For each additional enclosure a 4 mm seal is necessary.
- (2) Standard IP54 enclosure
- (3) Except option "Sinus filter" which needs an additional enclosure.
- (4) Option "cable entry via the top" is not compatible with the option "sinus filter".



ATV61	Option	a	a1	a2	a3	a4
EXC5C40N4, EXC5C50N4	With or without general options (3) or options depending on the power	1016	-	-	-	1016
	Cable entry via the top (4)	1000	-	408	408	1824
	Braking unit and / or options depending on the power (3)	1008	-	408	-	1420
	Braking unit + cable entry via the top (4)	1000	408	400	408	2228
	Motor choke	1008	-	-	408	1420
	Sinus filter	1008	-	-	808	1820
	Sinus filter + braking unit	1000	-	408	808	2224
EXC5C63N4	With or without general options (3) or options depending on the power	1216	-	-	-	1216
	Cable entry via the top (4)	1200	-	408	408	2024
	Braking unit and / or options depending on the power (3)	1208	-	408	-	1620
	Braking unit + cable entry via the top (4)	1200	408	400	408	2428
	Motor choke	1208	-	-	408	1620
	Sinus filter	1208	-	-	808	2020
	Sinus filter + braking unit	1200	-	408	808	2424
EXC5C40N...EXC5C63N, EXC5C50Y...EXC5C80Y	With or without general options or options depending on the power	1216	-	-	-	1216
	Cable entry via the top	1200	-	408	408	2024
	Braking unit and/or options depending on the power	1208	-	408	-	1620
	Braking unit + cable entry via the top	1200	408	400	408	2428
	Motor choke	1208	-	-	408	1620

- (1) Seal. For each additional enclosure a 4 mm seal is necessary.
- (2) Standard IP54 enclosure
- (3) Except option "Sinus filter" which needs an additional enclosure.
- (4) Option "cable entry via the top" is not compatible with the option "sinus filter".



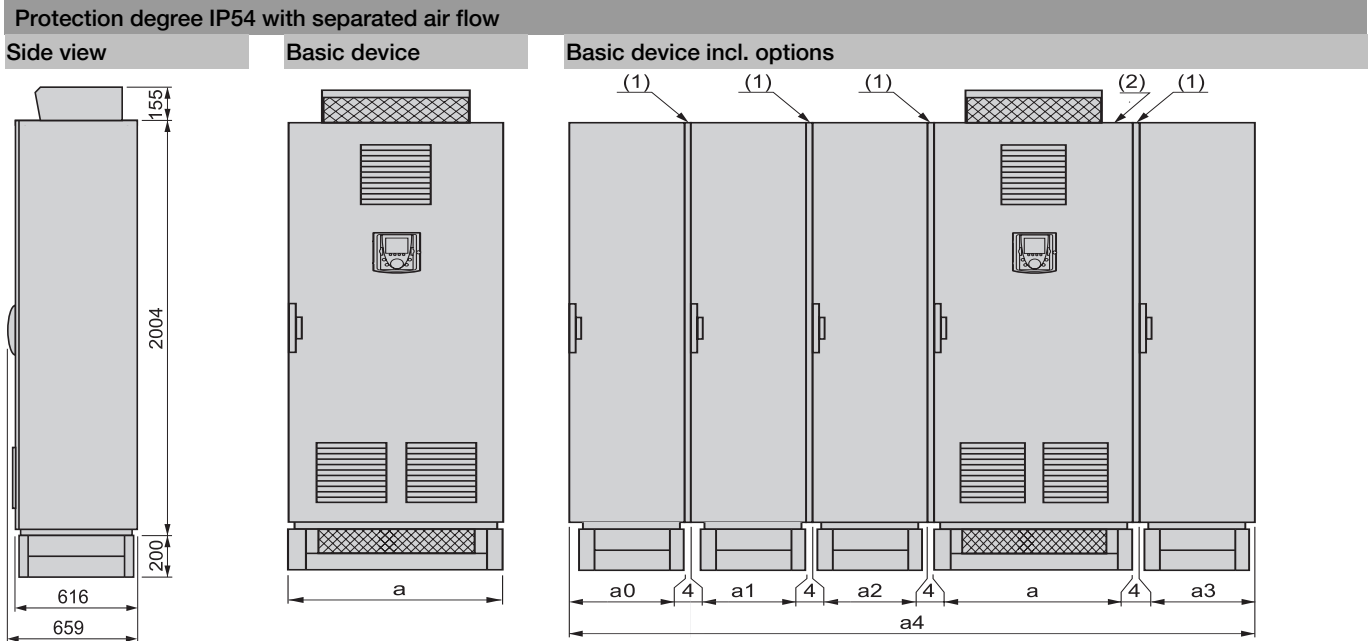
ATV61	Option	a	a1	a2	a3	a4	a5
EXS5D90N4...EXS5C13N4	With or without general options (3) or options depending on the power	616	-	-	-	-	616
	Cable entry via the top (4)	608	-	408	-	-	1020
	Sinus filter	608	-	-	608	-	1220
EXS5C16N4...EXS5C22N4	With or without general options (3) or options depending on the power	616	-	-	-	-	616
	Motor choke	608	-	-	408	-	1020
	Cable entry via the top (4)	608	-	408	-	-	1020
	Motor choke + cable entry via the top	600	-	408	408	-	1424
	Sinus filter	608	-	-	608	-	1220
EXS5C25N4...EXS5C31N4	With or without general options (3) or options depending on the power	816	-	-	-	-	816
	Cable entry via the top (4)	808	-	408	-	-	1220
	Sinus filter	808	-	-	608	-	1420
	Motor choke	808	-	-	408	-	1220
	Motor choke + cable entry via the top	808	-	-	408	-	1220
EXS5D90N...EXS5C16N, EXS5C11Y...EXS5C20Y	With or without general options (3) or options depending on the power	608	-	-	408	-	1020
	Cable entry via the top (4)	608	-	-	408	-	1020
	Motor choke and cable entry via the top	600	-	408	408	-	1424
EXS5C20N...EXS5C31N, EXS5C25Y...EXS5C40Y	With or without general options (3) or options depending on the power	808	-	-	408	-	1220
	Cable entry via the top (4)	808	-	-	408	-	1220
	Braking unit	800	-	408	408	-	1624
	Braking unit + cable entry via the top	800	-	408	408	-	1624
	Motor choke + cable entry via the top	800	-	408	408	-	1624
	Motor choke + braking unit + cable entry via the top	800	408	400	408	-	2028

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

(2) Standard IP54 enclosure

(3) Except option "Sinus filter" which needs an additional enclosure.

(4) Option "cable entry via the top" is not compatible with the option "sinus filter".



ATV61	Option	a	a0	a1	a2	a3	a4
EXS5C40N4	With or without general options (3) or options depending on the power	1008	-	-	408	-	1420
	Cable entry via the top (4)	1000	-	-	408	408	1824
	Braking unit and / or options depending on the power (3)	1008	-	408	400	-	1824
	Braking unit + cable entry via the top (4)	1000	-	408	400	408	2228
	Motor choke	1000	-	-	408	408	1824
EXS5C50N4	With or without general options (3) or options depending on the power	1008	-	-	408	-	1420
	Cable entry via the top (4)	1000	-	-	408	408	1824
	Braking unit and / or options depending on the power (3)	1008	-	408	400	-	1824
	Braking unit + cable entry via the top (4)	1000	-	408	400	408	2228
	Motor choke	1000	-	-	408	408	1824
EXS5C63N4	With or without general options (3) or options depending on the power	1208	-	-	408	-	1620
	Cable entry via the top (4)	1200	-	-	408	408	2024
	Braking unit and / or options depending on the power (3)	1208	-	408	400	-	2024
	Braking unit + cable entry via the top (4)	1200	-	408	400	408	2428
	Motor choke	1200	-	-	408	408	2024
EXS5C40N...EXS5C63N, EXS5C50Y...EXS5C80Y	With or without general options (3) or options depending on the power	1208	-	-	408	-	1620
	Cable entry via the top (4)	1200	-	408	400	408	2428
	Braking unit and / or options depending on the power (3)	1208	-	408	400	-	2024
	Braking unit + cable entry via the top (4)	1200	408	400	400	408	2832
	Motor choke	1200	-	-	408	408	2024

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

(2) Standard IP54 enclosure

(3) Except option "Sinus filter" which needs an additional enclosure.

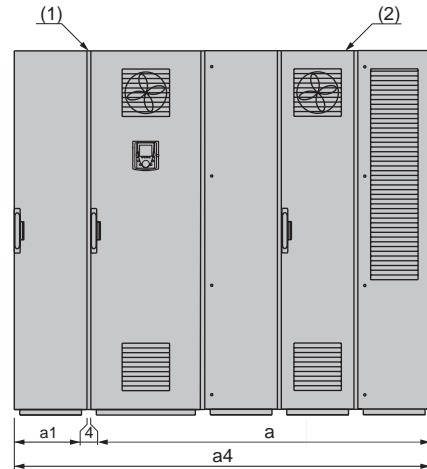
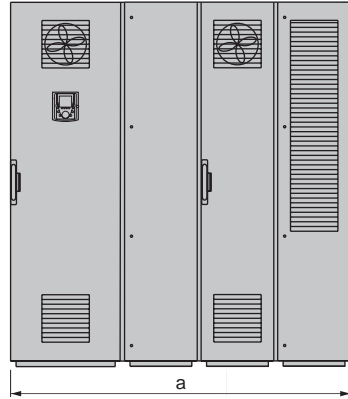
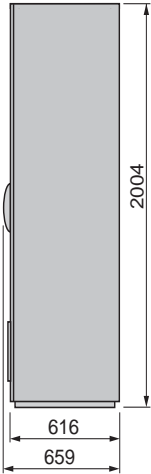
(4) Option "cable entry via the top" is not compatible with the option "sinus filter".

Design with internal cooling circuit

Side view

Basic device

Basic device incl. options



ATV61	Option	a	a1	a2	a3	a4
EXA●C63N4...C71N4	With or without general options or options depending on the power	1828	-	-	-	1828
EXA●C63N...C90N	Line contactor and line reactor	2028	-	-	-	2028
EXA●C80Y...M12Y	Cable entry via the top	1820	408	-	-	2232
	Line contactor and line reactor with cable entry via the top	2020	408	-	-	2432

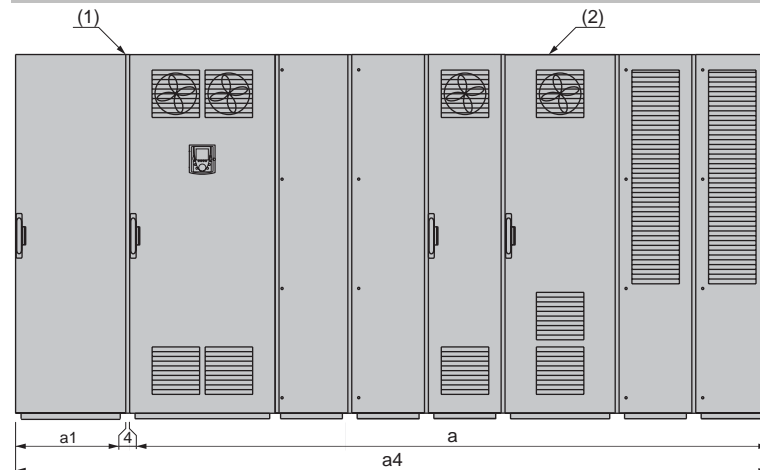
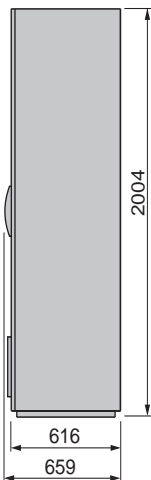
(1) Seal. For each additional enclosure a 4 mm seal is necessary.

(2) Standard enclosure

Design with internal cooling circuit

Side view

Basic device incl. options



ATV61	Option	a	a1	a2	a3	a4
EXA●C90N4...M14N4	With or without general options or options depending on the power	3440	-	-	-	3440
EXA●M11N...M18N	Line reactor	3844	-	-	-	3844
EXA●M15Y...M24Y	Cable entry via the top	3432	608	-	-	4044
	Cable entry via the top + line reactor	3836	608	-	-	4448

(1) Seal. For each additional enclosure a 4 mm seal is necessary.

(2) Standard enclosure

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Due to evolution of standards and equipment, the characteristics indicated in texts and images of this document do not constitute a commitment on our part without confirmation.
Design: Schneider Electric Power Drives
Photos: Schneider Electric Power Drives